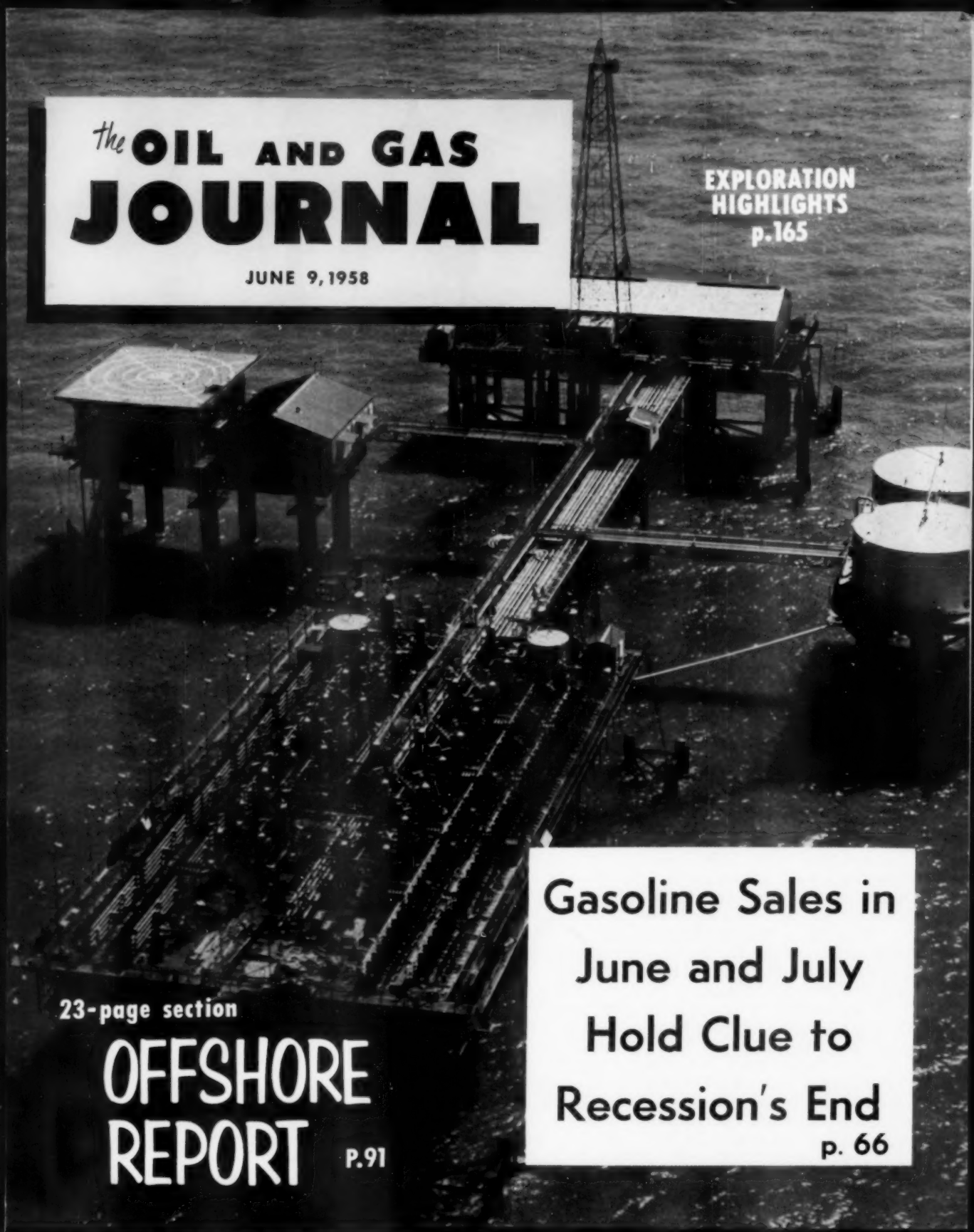
the OIL AND GAS JOURNAL

JUNE 9, 1958



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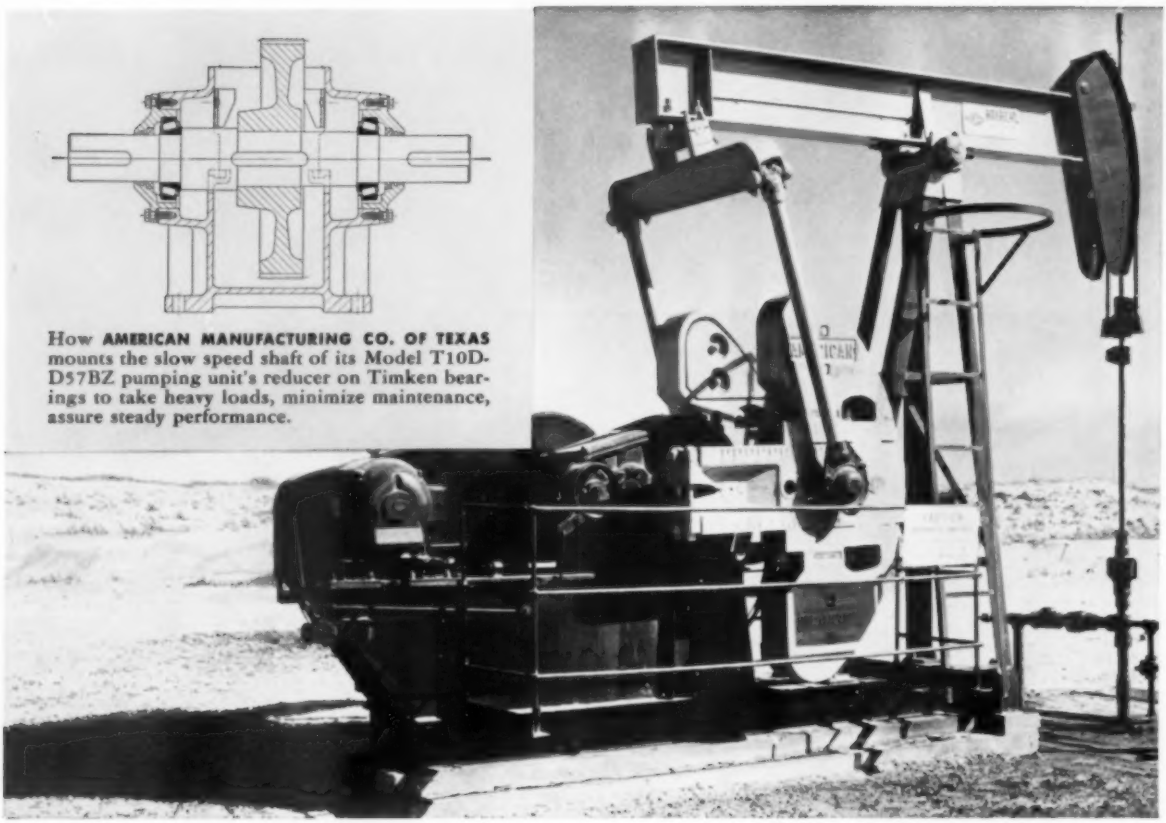
Gasoline Sales in June and July Hold Clue to Recession's End p. 66

ONE DOLLAR PER COPY

Computer Enables Complete Automation of a Process Plant p. 115

How **AMERICAN MANUFACTURING CO. OF TEXAS** mounts the slow speed shaft of its Model T10D-D57BZ pumping unit's reducer on Timken bearings to take heavy loads, minimize maintenance, assure steady performance.



TIMKEN® bearings take all the thumps —keep pumping unit maintenance-free

TO make sure its Model T10D-D57BZ pumping unit would run year 'round with little if any attention, American Manufacturing Company of Texas specified Timken® tapered roller bearings for the reducer's slow speed shaft. Because the reducer has herringbone gears, the bearings must fix and position all shafts. And the bearings on the slow speed shaft have to take heavy thumping loads as the pump works.

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TAPERED ROLLER BEARINGS ROLL THE LOAD

the OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
June 9, 1958

Oil men soon will know if their recession is ending:

What happens to gasoline demand the rest of this month and next will tell the story.

If the American motorist uses large quantities of this big-money product, the oil industry will approach the winter season in excellent shape (p. 66).

The result will be moderate increases in refinery runs, production at the well, and maybe a stepup in drilling.

To be significant of an upturn, gasoline demand this summer must reach these volumes: 4,400,000 bbl. daily in June, 4,202,000 bbl. daily in July, and 4,155,000 bbl. daily in August.

June traditionally since the war has showed a gasoline demand 27.7% higher than January. The 4,400,000 bbl. daily benchmark this June would mean gasoline demand back to normal. The figures for July and August are last year's demand levels. If marketers show good gains over these in both months, it will be cheering news.

The excess stock position has been corrected since February.

In 3 months the excess has been reduced by more than 41 million barrels. Crude stocks are now about right. Products are not too far out of joint.

Economists now advise this course for the rest of the year: Only moderate stepup in refinery runs. The danger of big jump in runs is pulling down crude stocks too low and piling up products. Low crude stocks would be an invitation for producers to open up their wells too wide. As it stands, operators can expect some production increases as the high-demand winter season approaches.

Two important changes in the imports-control program:

...Unfinished gasoline has been put under the voluntary program. Importers are asked to limit their entries through rest of year to current levels.

...West Coast imports limits will be cut sharply. The new level is expected to be 150,000 to 155,000 bbl. daily. Exact figure will depend on how much is allowed newcomers.

Don't expect trial before next year on those federal grand jury indictments citing 29 oil firms with conspiracy to violate antitrust laws in their pricing practices (p. 68).

A long drawn-out legal battle is almost a sure thing. The charge strikes at the foundation of the historic pricing program of the industry.

The industry plans to defend its pricing policies as basic to its way of doing business. When one company posts a higher crude price, others follow to protect their source of raw material and stay in business. When crude prices go up, products prices naturally follow.

Offshore operators are tightening their belts to cut costs and increase efficiency in this pinchback era.

Here's the picture as shown by a special study:

...Drilling—Rising costs and low allowables put a high premium on fast drilling.

This is being achieved by drilling more straight holes from mobile structures rather than deviated wells from fixed platforms, by planning closer on services and supplies, by giving footage contracts, by keeping better maintenance-expense records, and by cutting crew size (p. 91).

...Producing—Emphasis is on cheaper operations to offset low allowables.

Changes taking place to accomplish this include completing more wells dually and triply, devising new, cheaper workover techniques, and applying more automation and remote control (p. 97).

...Pipelining—Biggest year yet is in prospect for building offshore lines.

Survey shows 312 miles of pipe for gas or gas-condensate will be laid off Louisiana this year. And 49 miles more are scheduled for 1959. A big-inch crude line extending offshore is now being talked. It could be a joint venture and a common carrier line to serve producers (p. 108).

...Reserves—Lull in drilling doesn't obscure value of offshore area in eyes of the oil man.

The Louisiana-Texas Continental Shelf is still regarded generally as one of nation's greatest remaining source of new oil reserves (p. 103). But a settlement of the federal-state tidelands dispute which has halted new leasing and hurt an expansion in drilling still is far away (p. 110).

...The future—A whale of a lot of drilling lies ahead.

Very little development has been done so far. Wildcats have aimed chiefly at proving the productivity of the structure. Very few fields have been even semideveloped (p. 165).

Some offshore drilling contractors are trying to beat

the present drilling slump offshore by taking farmouts from the majors (p. 61).

Promising acreage has become available in the last few weeks on untouched leases which are nearing expiration.

If the contractor hits, he will pick up half interest in the lease for drilling the well. It's one way to emerge from the slump better than ever. Some contractors figure it's worth a gamble because they're doomed to bankruptcy anyway if they can't put their costly rigs to work.

French drillers have achieved glowing success with their turbodrills.

Four turbodrills put to work in Lacq field this year have almost cut in half the time required to put down a 12,000-13,000-ft. well.

At 8,000 ft. in the hard limestone, the turbodrill makes 300 ft. a day and the rotary makes only 60 ft. The French, like U. S. drillers who've experimented with the new type drill, have bit and crooked-hole troubles.

Williston basin has two new strikes.

Texaco recovered oil from the Devonian at a deep wildcat 3 miles from production off the west side of the Nesson anticline.

Hunt Oil has indicated Mississippian discovery northeast of Newburg field in Bottineau County.

Utah has its second Mississippian discovery.

Shell's 1 North Springs Unit in Carbon County reportedly flowed 2,650 M.c.f. of gas daily on test of Manning Canyon-Mississippian. Production from this zone would be new pay for the region. Only commercial Mississippian production in the state is at Big Flat in north end of Paradox basin.

Texas seems assured of another offshore oil field.

Hunt Oil 1 State Tract 20-S 2 miles off Jefferson County reportedly flowed at rate of 150 bbl. daily from perforations at 7,189-93 ft.

Discovery is located on a 5,760-acre lease block and sits astride a deep-seated salt dome (p. 70).

Petrorep, the company that found oil in France's big Paris basin, is drilling two new tests and has staked a third near the discovery.

The Coulommes 2, just 1 mile west of the discovery, was below 3,740 ft. last week. Drilling has just begun on Coulommes 3, and the Coulommes 4 has been staked.

The discovery, about 27 miles east of Paris, opened the basin last February when it recovered 50 bbl. of light oil on a 75-minute test of Dogger section at 6,060 ft.

A deal for 30,000 M.c.f. daily of gas from the Deep

Carter-Knox field, Grady County, Oklahoma, is in the making.

Offering price for this big package is in excess of 14 cents an M.c.f. This price would make it the only Oklahoma gas that high outside the new northwest Panhandle fields.

Sinclair Pipe Line Co. has acquired 1,700 acres on Delaware Bay, northeast of Milford, Del., at cost of $400,000.

Site has a 1-mile water front, is 90 miles south of Philadelphia. It could serve as a deepwater terminal for a pipeline to move crude from supertankers to refineries in the Philadelphia area. Big tankers now are forced to unload part of their cargo into smaller vessels.

Increasing French interest in a way to move gas from Algerian discoveries to Europe is explained by some late estimates on Algerian reserves.

Hassi R'mel field is described as another Lacq.

Shippers now may order gasoline by octane number at all terminals on Great Lakes Pipe Line.

New trial plan permits loading of regular and premium to produce any octane number between those specified for pipeline shipments.

This custom blending makes possible flexibility for shippers who do not require a premium as high as the specified 99-octane.

Plant operators may be overlooking energy potentials of plant-process streams.

In many cases it's necessary to lower the pressure of an oil or gas stream prior to the next step in the process. Common way of doing this is simply to put a control valve on the stream and throttle back the high pressure. But by taking the drop in this way, potential energy is lost.

Operator can get some cheap horsepower by installing pumps or turbines for prime movers and using the pressure drop as the energy source.

Case in point: LaGloria Oil & Gas at Falfurrias, Tex., has put this idle energy to work. It is using high-pressure oil, fuel gas, and exhaust steam to power equipment rated at over 5,000 hp.

The installations represent a savings of from $60-$90 per horsepower over conventional prime movers.

Definite offer for Hancock Oil Co., Los Angeles will be made before the week is out by Jersey Standard, according to reports on the West Coast.

What the offer will be is still a speculation. Best guess is 1¼ shares of Jersey for each Hancock share. The deal has been brewing for weeks and apparently has not been affected by the recent fire at Hancock's Signal Hill refinery.

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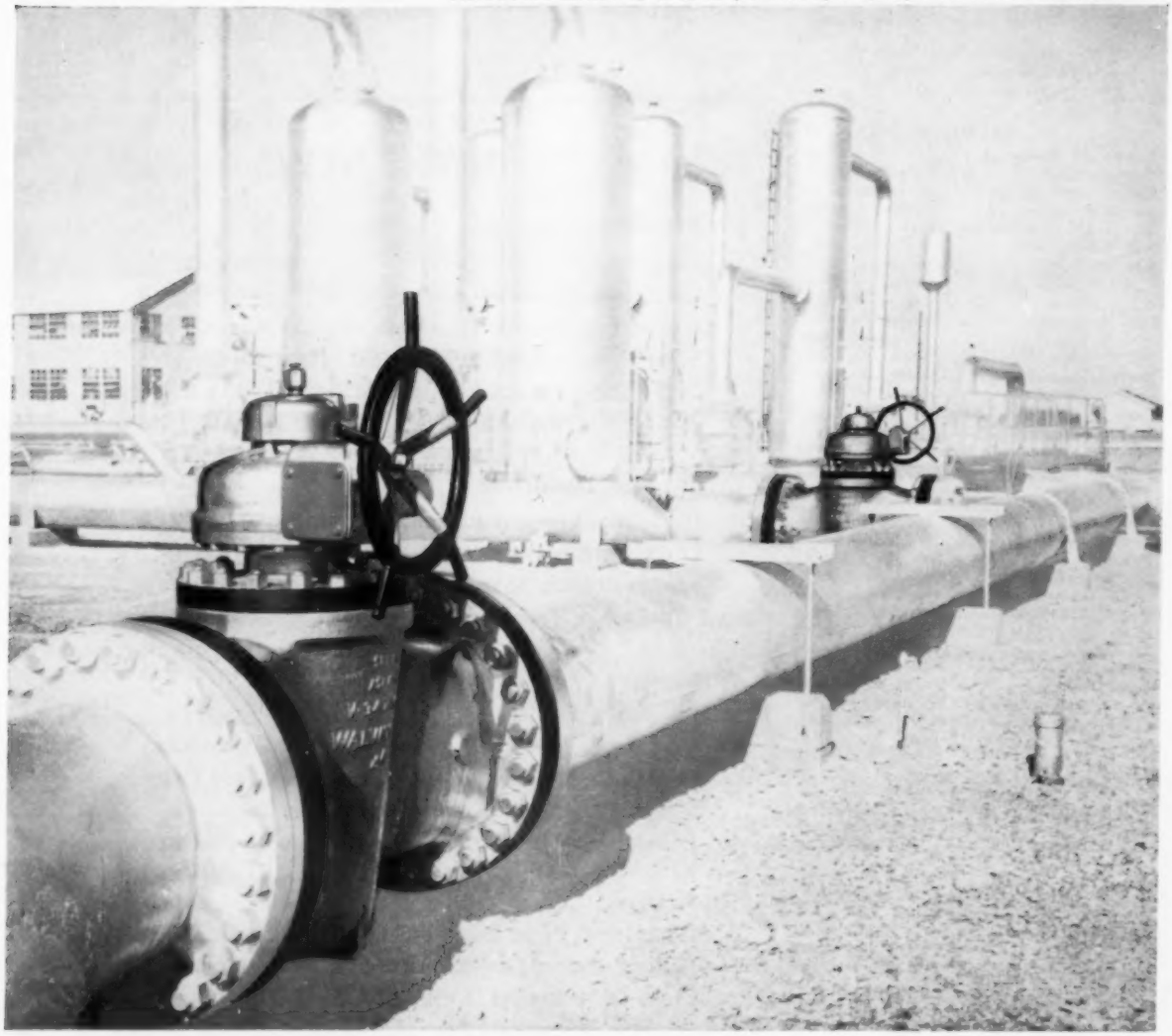
Shown here are Walworth 24" Ball Bearing Gear Operated Type Lubricated Plug Valves on inlet to scrubbers in a gas booster station. Walworth Lubricated Plug Valves are available in sizes from ½" to 30" for pressures up to 5,000 psi and for vacuum service.



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OFFSHORE REPORT

Offshore Operators Aim at Faster Drilling Rates **91**

By Ed McGhee

Fast-rising costs have caught Gulf of Mexico offshore drillers in a squeeze against equally fast-falling allowables. As a result these operators are actively searching for ways to drill wells cheaper. They are speeding up drilling in four different ways, giving footage contracts, cutting maintenance expenses, and cutting crew size and offshore living facilities.

Offshore Producers Gear Operations to Lower Allowables **97**

By Ed McGhee

Some of the changes they are making to make the best of a bad situation are: (1) Completing more wells dually and triply; (2) devising new, cheaper workover techniques; and (3) applying more automation and remote control. A bulk allowable for a month or 2-month period is needed to make up for lost producing days.

Continental Shelf Still No. 1 for New Reserves and Production **103**

By Neil Williams

Every indication points to the fact that the potentialities of the Continental Shelf for additional drilling and development are myriad. There are a large number of previously undrilled high-cost lease blocks, and additional development around existing fields will require the drilling of a large number of wells, Tables 1 through 5 contain much new information on offshore drilling, wells, and fields.

Offshore Pipelines and What It Costs to Build Them **108**

By Gene T. Kinney and Larry Resen

This year will be the biggest yet in construction of pipelines in the Gulf of Mexico. About 312 miles of pipe will be laid off Louisiana during 1958. Comparative costs show that it costs about 2½ times more to lay an offshore line than it does to lay one in the Mid-Continent.

No Tidelands Settlement in Sight **110**

By Bertram F. Linz

New California Offshore Platform Is Big and Versatile **111**

By D. H. Stormont

It will be able to drill 2 wells at once and up to 25 total. And it can be converted to a production platform with ease if economically practical. Drilling will be carried out with all electrical equipment.

TECHNOLOGY—OPERATION

The Computer in the Feedback Loop of a Control System **115**

By Ira C. Bechtold

This is the ideal control situation in that the computer would receive from the sensing instrument all of the same information now being received by the recorder-controllers. Some special process computers suitable for such application are now available.

The Foreman's Page **122**

On The Job . . . In The Fields **127**

Dock for handling large tools—Skid-mounted oil-well maintenance unit—Bins on service truck for carrying hand tools—Wrecked diesel is braze-welded.

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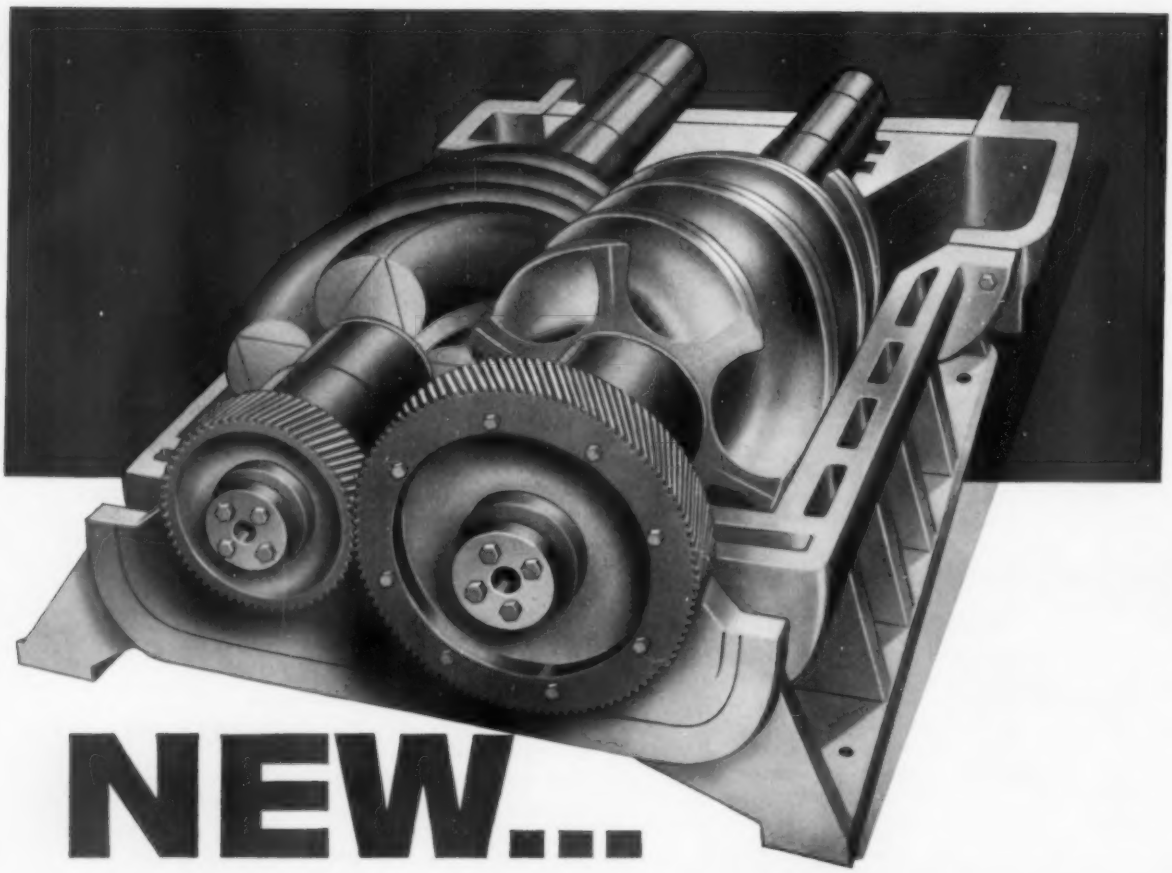

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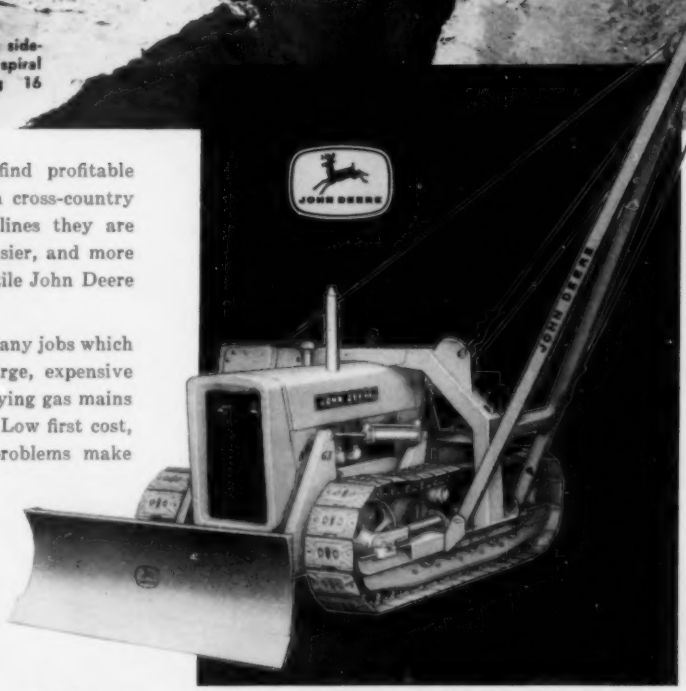

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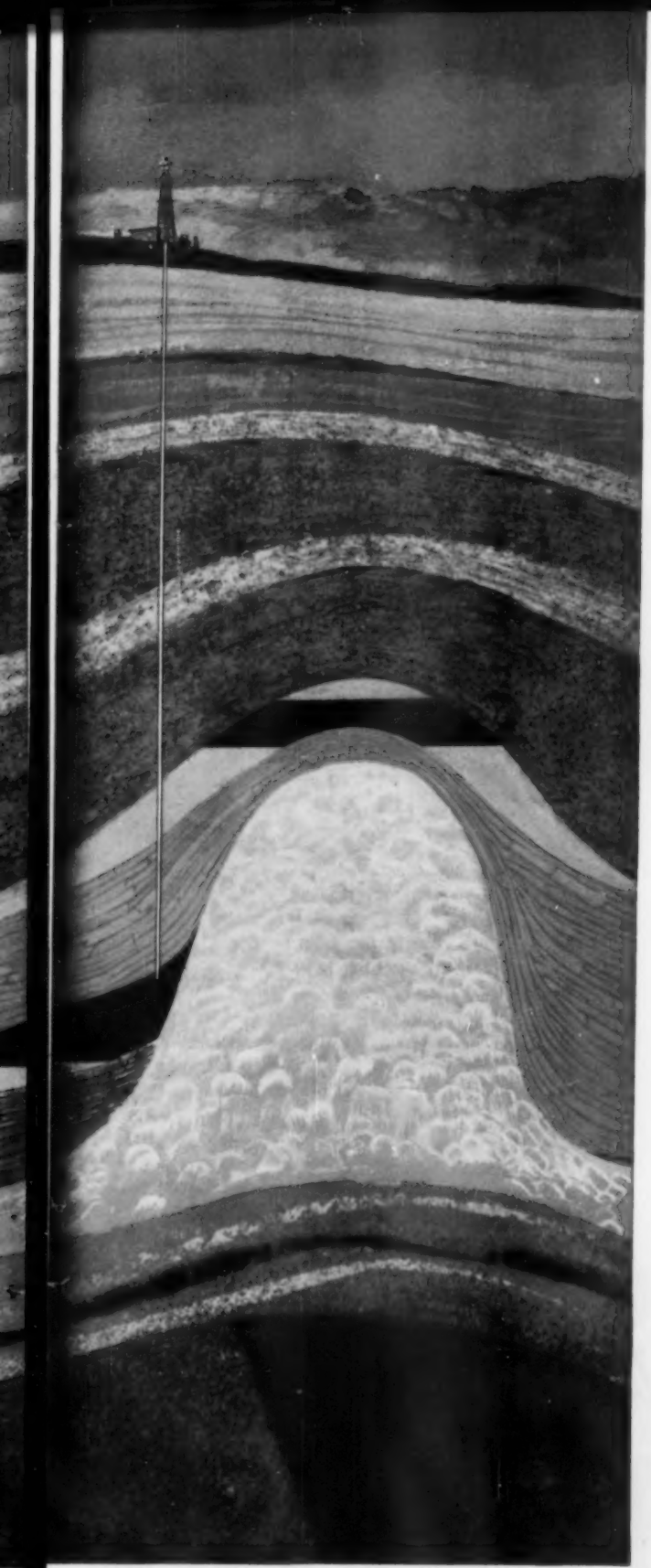

3 miles down— and still going

HOW DEEP CAN WE GO FOR OIL? Certainly, only as deep as present-day casing will permit. As yet, we haven't reached our limit. The rigs are still holding up; the drill pipe, casing and tubing are taking their daily beatings and still doing their jobs.

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National Warm-Worked Casing—Grade N-80. An extremely high-strength casing possessing a uniformity of physical properties which give it high collapse resistance and greatly increased joint strength. It is hydrostatically tested to 80% of minimum yield strength up to a maximum of 10,000 psi.

National Deep-Well Casing. The strongest casing produced under A.P.I. specifications, to meet constantly increasing depths. Due to the severe service for which it is intended, it is hydrostatically tested to 80% minimum yield strength up to a maximum of 12,000 psi.

National (B) *Buttress-Thread.* Developed to satisfy the need for a casing joint which will safely and economically support the weight of deep-well casing. The buttress-thread joint is comparable in strength to that of the body of the pipe itself.

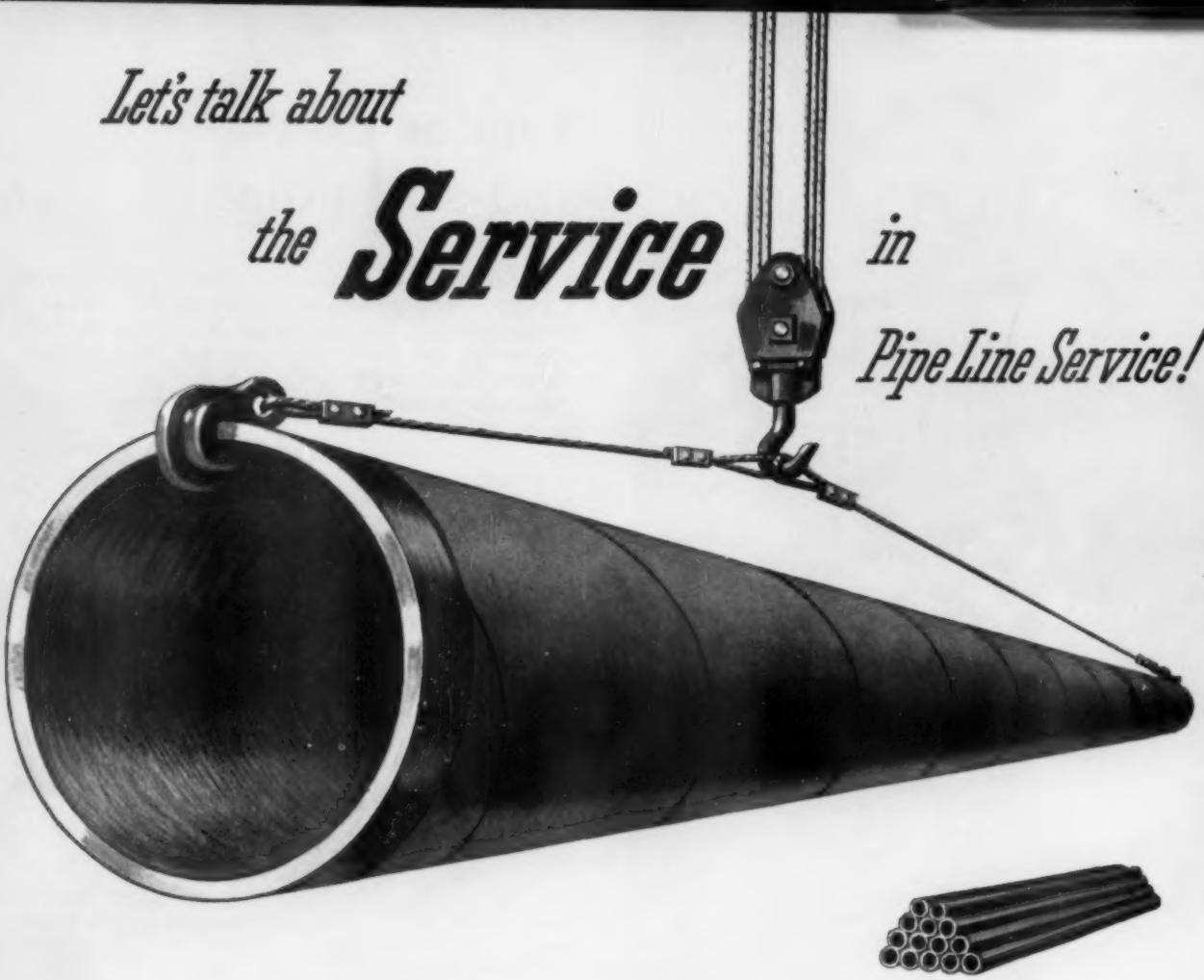
• • •

For further information, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Ask for Bulletin No. 15.

USS and National are trademarks

USS **National Tube Division of United States Steel**

Let's talk about the **Service** *in Pipe Line Service!*



A company doesn't become a leader through quality of product alone. Although Pipe Line Service through the years has proved consistently that quality depends on coating and wrapping under controlled plant conditions, *service* is half the battle.

By service, we mean storing your pipe *at no cost to you* . . . plants strategically located near your sources of supply . . . and large storage facilities to allow you to purchase pipe when delivery is most favorable. Your pipe will be held in storage until needed—and then coated under the PLS high standards of uniformity.

You *always* get a freshly applied coating job at the time pipe is ready to be laid. And PLS will ship your protected pipe *where* you want it . . . *when* you want it!

All this, *plus* the service of a PLS representative when needed. It's his job to help you in the proper handling, storage and laying of PLS protected pipe, to give you the maximum return on your investment.

This combination of quality *and* service assures you of the finest in pipe protection. On your next coating job call in your nearest PLS representative—you'll find that he can save you time, trouble and money.

There's a PLS plant strategically located to serve YOU!

Also sales offices at

Atlanta, Georgia — Lincoln, Nebraska
Tulsa, Oklahoma — Houston, Texas

PIPE LINE SERVICE CORP. SERVICE EQUIPMENT MATERIALS FRANKLIN PARK, ILL.

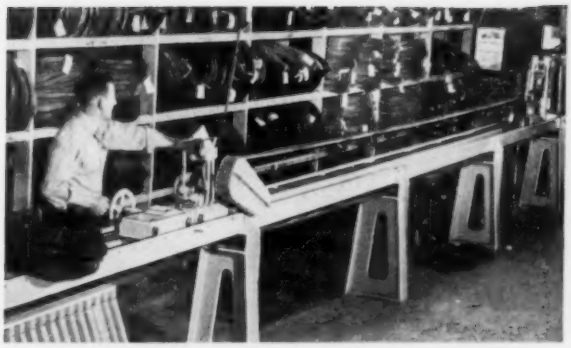
Pipe Line Service Corporation

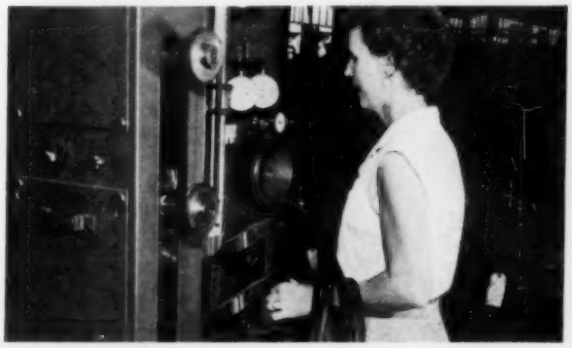
FRANKLIN PARK, ILLINOIS

Quality pioneers in coating and wrapping pipe for a quarter century

A SUBSIDIARY OF AMERICAN STEEL FOUNDRIES

Only V-Belts with the Green Seal give you





Precise measurement of every Goodyear V-Belt and coding to unusually fine tolerances prepare the way for more exact matching of sets—at factory, warehouse, or by distributors. The built-in quality of Dimensional Stability assures that belts stay matched, for life.

dimensional stability – Unsurpassed steel cables or exclusive Triple-Tempered (3-T) Cords provide true dimensional stability from factory to drive.

– that assures you of –

matched sets that stay matched – Sets of belts are matched to the closest standards. And they stay matched under all conditions of storage.

minimum stretch on the drives – Belts on multiple drives work as a team. You eliminate "loafers" – or overworking any of the belts.

– and you also get –

high modulus – You get the greatest possible resistance to shock-loads. You're protected from power loss due to "creep."

friction balance – Covers have the ideal coefficient of friction. No sticking or grabbing in the grooves. And no dusting.

mildew immunity – You're safe from the effects of moisture – in use or in storage. Stand-by belts are always ready for use – no matter how long you keep them.

– and all that pays off in –

–maximum, trouble-free horsepower hours–at minimum cost – on any and every drive in your plant. It's easy to see why you should see your Goodyear Distributor for details. Or write to Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

60 YEARS

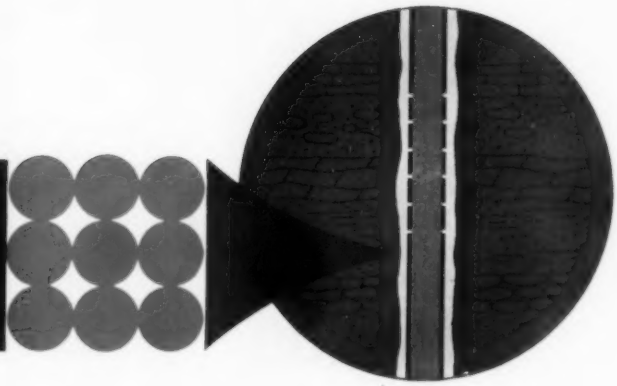
THE GREATEST NAME IN RUBBER

Note: Constructions shown apply only to belts up to 112" in length

Watch "Goodyear Theater" on TV—every other Monday, 9:30 P. M., E. D. T.

Compass, E-C Cord, Hy-T, Green Seal–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

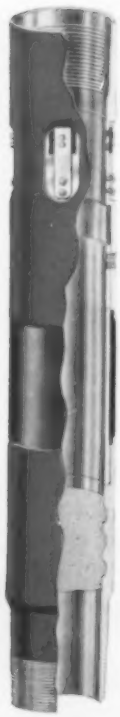
"PORE PATTERN"
PROTECTION:



primary cementing by Halliburton

Halliburton's world-wide experience in cementing all types of formations and under most well conditions assures you of more "on the job know-how" than all other cementing experience combined. Around the clock research and development results that are immediately put into field practice give you every advantage that good cementing must provide, and you get this benefit in reducing potential remedial costs.

Look to Halliburton for continued leadership in primary cementing... Give your well the full benefits that only Halliburton experience and quality can provide.



THE RIGHT TOOL... FOR THE RIGHT JOB!

CASING FORMATION PACKER

This tool for cementing casing in cable tool or rotary drilled slim holes is effective in shallow gas fields without killing flow of gas or contaminating the formation with cement... May be set on shoulder above a reduced open hole, on bottom of hole, or at any point off bottom by using casing or liner from tool to bottom of well. The sleeve type packer is expanded when weight of casing set down exceeds 8,000 lbs., the force required to shear sleeve pins. Lifting Lugs hold tool together and permit lifting pipe after sleeve pins are sheared. Flapper valve port covers are constructed to seal in low-pressure areas and tested to hold 2,000 psi pressure from outside.

FULL-FLOW PACKER SHOE

Helps protect the formation below while cementing tubing or casing in new or old cased or uncased oil, gas or water injection wells. After cementing, tool is closed, plugs and seat are discharged out of shoe. No internal parts remain in the string to be drilled out. Danger of drilling fluid damage is reduced. Suitable for fracturing or treating of old wells where no casing is in the hole.

CEMENT BASKET

Successfully used to help retain cement and protect weak formations by reducing slurry loss or formation breakdown. Run on outside of casing or liner at point above weak or porous formations. After cement is pumped, basket acts as a support for heavy cement columns until initial set.

S-3 CASING CENTRALIZER...The Industry's Choice

The S-3 Casing Centralizer aids in effecting uniform placement of cement around casing... Its heat-treated, lap-welded springs center the casing to minimize channeling... Helps to keep future remedial costs to a minimum.

TUBING CENTRALIZER

This useful Halliburton tool is utilized on tubing strings in deep wells to help protect tubing and collars against wear when the string is frequently pulled and re-run. In some areas, tubing is used as production string and for water injection wells; centralizers give better centering in the bore hole and allow better placement of cement around tubing string. Tubing centralizers are also used on strings for protection of flow valves (gas lift).

SLIM HOLE CENTRALIZER

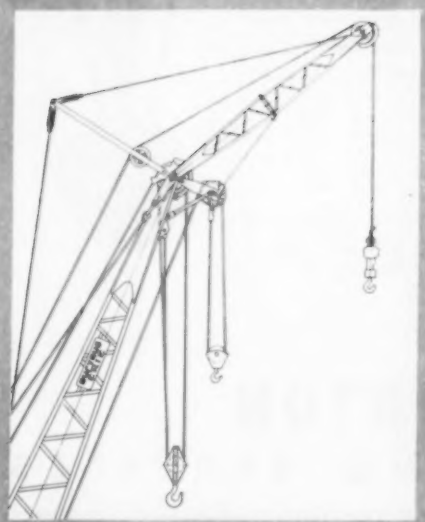
This type of centralizer is particularly suitable where the clearance between the string being cemented and the slim hole or casing is limited and cement might channel. Available for specific slim hole sizes and for liners run in casing.

HALLIBURTON
CEMENTING SERVICES

HALLIBURTON OIL WELL CEMENTING COMPANY • DUNCAN, OKLAHOMA

284 SERVICE CENTERS – JUST MINUTES AWAY FROM YOUR WELL

THIRD DRUM AND JIB ADD TO WORK RANGE



A jib and third drum are also available to extend the work range of the 38-B. Jibs are available in 15-, 20-, 25-, and 30-ft. lengths. Drawing shows one possible combination: four-part main hoist line, single line on jib, two-part line on third drum.

Get better control for easier load handling!

With a Bucyrus-Erie 38-B crane on an offshore location, Southeastern Drilling Co., Dallas, Texas, gets more than sheer lifting capacity. They get features which save time and add to the safety of their entire operation.

Independent power-controlled lowering boom hoist, helps spot loads accurately.

Special disc-type boosters are used on drum clutches, giving the 38-B exceptionally precise control. They won't kick out if the drumshaft reverses. The operator can lower loads with hoist clutch engaged, using machinery friction as a brake. Clutches are instantly responsive, self-adjusting for weather and temperature conditions.

Throughout the 38-B you'll find many more features like these for better performance on every job — offshore, in the field, or around refineries.

See your Bucyrus-Erie distributor today and get all the facts. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

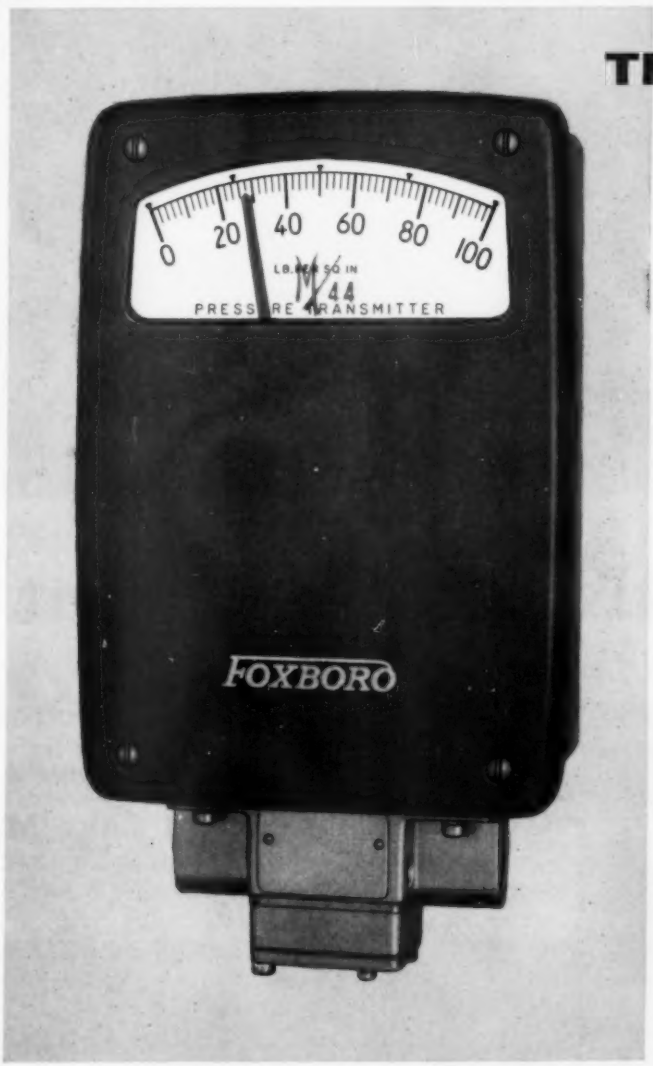
535E58C

BUCYRUS ERIE

MODERNIZE to economize!

read pressure up to 20 ft. away!

on the FOXBORO M/44 INDICATING PRESSURE TRANSMITTER



You can check pressure readings at a glance on the Foxboro Pneumatic Indicating Pressure Transmitter. Its open-face, horizontal, 4-inch indicator scale and eye-catching red pointer are clearly visible as far away as 20 feet.

But high readability is just part of the story. Actually, this instrument was engineered from the ground up. Makeshift arrangements have been eliminated, hung-on gauges are gone. Everything is included in one compact (5¾" x 8⅛"), ready-to-install instrument that weighs only eight pounds.

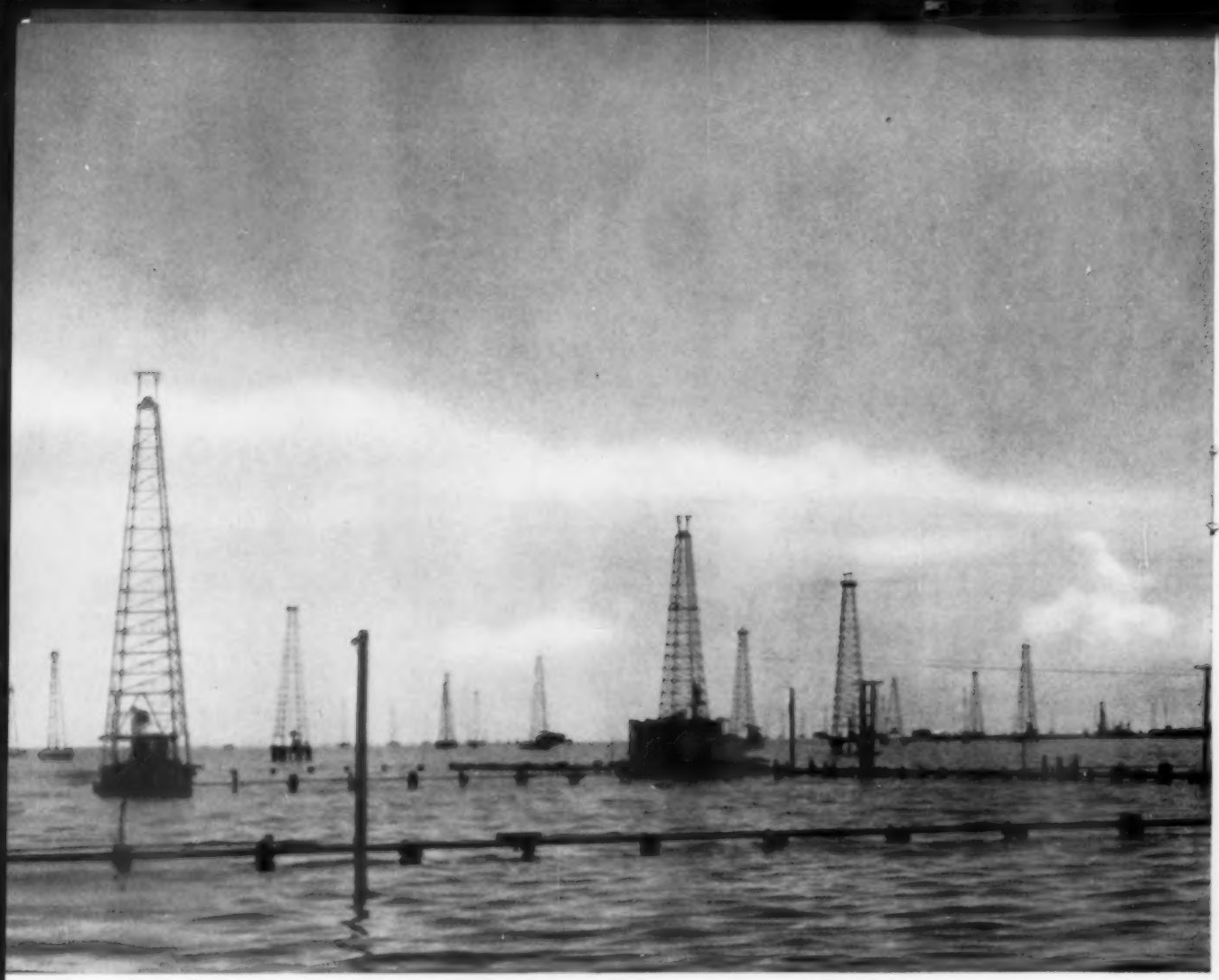
Because the indicating pointer is direct-connected to element and transmitter, calibration is easy . . . and you can re-zero the transmitter externally. All M/44 components are standard, performance-proved Foxboro parts. This makes it easier to stock and service.

A wide selection of interchangeable Foxboro pressure measuring elements gives the M/44 range limits of 0-30" water to 0-6000 psi. Elevated ranges are available, too.

Write for complete details. The Foxboro Compnay, 606 Norfolk St., Foxboro, Mass.

FOXBORO REG. U.S. PAT. OFF.

INSTRUMENTATION FOR INDUSTRY

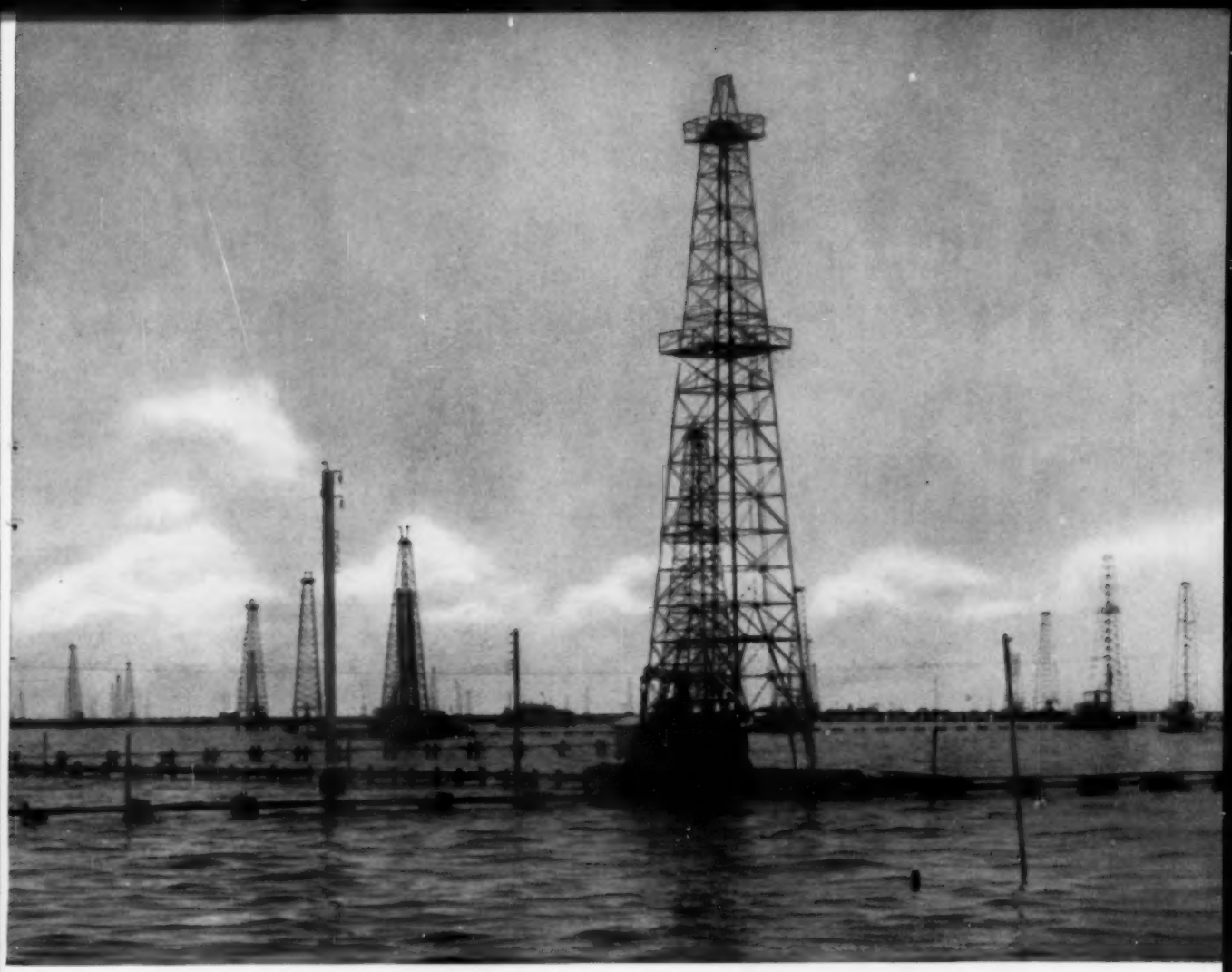


RAYMOND'S important role

Development of Prestressed Concrete Cylinder Piles a boon to oil companies on Lake Maracaibo

LEFT: Giant floating rig in action at job site.

BELOW: Pre-fabricated prestressed concrete cylinder pile en route to platform location.



in the great "Oil Rush" of '58

Not since the days of Spindle Top has the world seen such an oil boom! At Lake Maracaibo, Venezuela, offshore rigs are springing up in amazing numbers, and the swish and thump of pile drivers fill the air. At this impressive, industrious exploration and drilling site, such oil giants as Shell, Mene Grande, Signal, Superior, Sun and San Jacinto have turned to Raymond to provide derrick platform foundations. The reason: Raymond's revolutionary Prestressed Concrete Cylinder Pile. This, the latest foundation development in our 60 year history, assures complete protection against the corrosive properties of Lake Maracaibo. In addition, Raymond Cylinder Piles offer greater structural strength, increased load capacities and longer life. And, thanks to a unique assembly line process, the manufacturing of cylinder piles at the job site saves time and money.

Raymond Cylinder Piles are manufactured in a series of sections placed end-to-end, which are joined by post-tensioned cables of high tensile steel wire. The sections are then grouted to form a homogeneous, impervious support of extraordinary strength and durability. To meet the demands of the new contracts, we are expanding our cylinder pile manufacturing yard, which is located right at the job site. When completed, this yard will be the largest of its type in the world!

For over 50 years, Raymond has served the oil industry, and since 1926, we have maintained a permanent office in Venezuela. You will find Raymond foundations supporting offshore drilling rigs, tanker wharves, cat-crackers and storage tanks just about everywhere oil is drilled and refined. May we also serve you?

FOUNDATIONS FOR THE STRUCTURES OF AMERICA... COMPLETE CONSTRUCTION SERVICES ABROAD

RAYMOND CONCRETE PILE COMPANY

A DIVISION OF RAYMOND INTERNATIONAL INC.

140 CEDAR STREET
NEW YORK 6, N. Y.

Branch offices in principal cities of the United States. Divisions and subsidiaries in Canada, Latin America and other countries.

Your Well Is Safe With

RECTORHEADS

the head that seals with the Ring-of-Steel

More than 125,000 Rector casing head installations prove that you can forget about pressure leaks when your well is equipped with Rectorheads. For working pressures to 15,000 psi . . . regardless of temperature extremes . . . the Rector ring-of-steel provides a lifetime seal.

There is no resilient packing to flow under pressure or deteriorate from heat or time. The casing is welded to a steel ring that fits in a precision ground seat. There is no stress on the weld when the flange bolts are tightened. A steel API ring gasket completes the permanent, maintenance-free seal.

For well safety and long range economy, specify RECTORHEADS . . . now in sizes through 20". Order from your favorite SUPPLY STORE.

RECTOR WELL EQUIPMENT COMPANY INC

★ MAKING THE OIL INDUSTRY SAFER

1100 NORTH COMMERCE ST. FORT WORTH, TEXAS

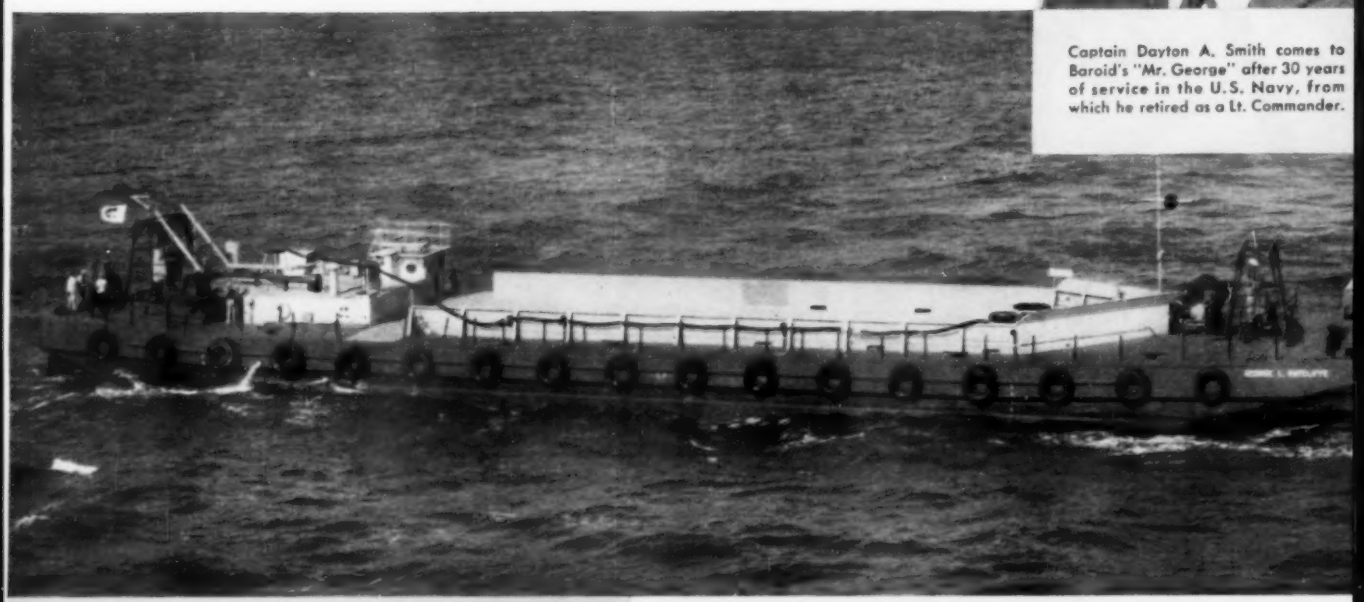
Houston Plant: 2215 Commerce St.

EXPORT REPRESENTATIVES: Continental Supply Company • Mid-Continent Supply Company • Oil Well Supply Company

"Allis-Chalmers Diesels on the 'MR. GEORGE' give wonderful service,"

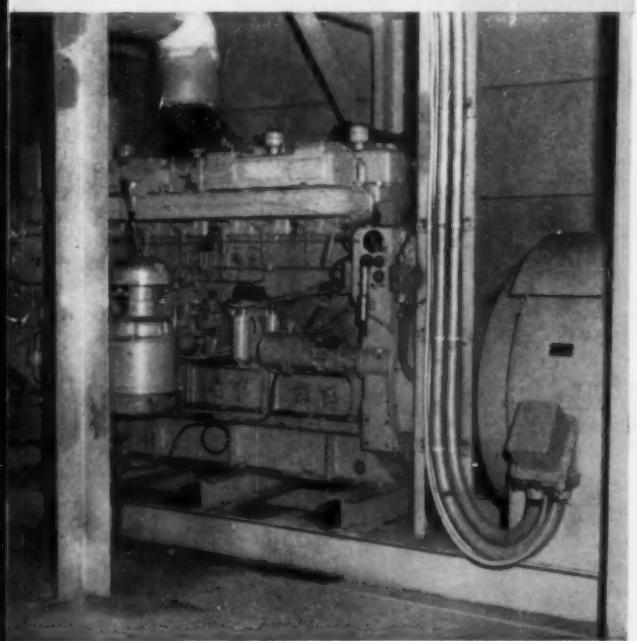
SAYS CAPTAIN DAYTON A. SMITH

Captain Dayton A. Smith comes to Baroid's "Mr. George" after 30 years of service in the U.S. Navy, from which he retired as a Lt. Commander.



The "Mr. George" is 196 ft long, 42 ft wide, 12 ft deep—has payload capacity of more than 1,500 tons of bulk BAROID* and other drilling mud additives. It carries Coast Guard Customs Registration and Star A-1 American Bureau of Shipping Certification.

*Registered trademark of Baroid Division, National Lead Company.



One of two Allis-Chalmers Model 2505 diesel engines driving 250-kw generators, providing power for propulsion, pumping, winches — all equipment aboard the "Mr. George."

BM-17

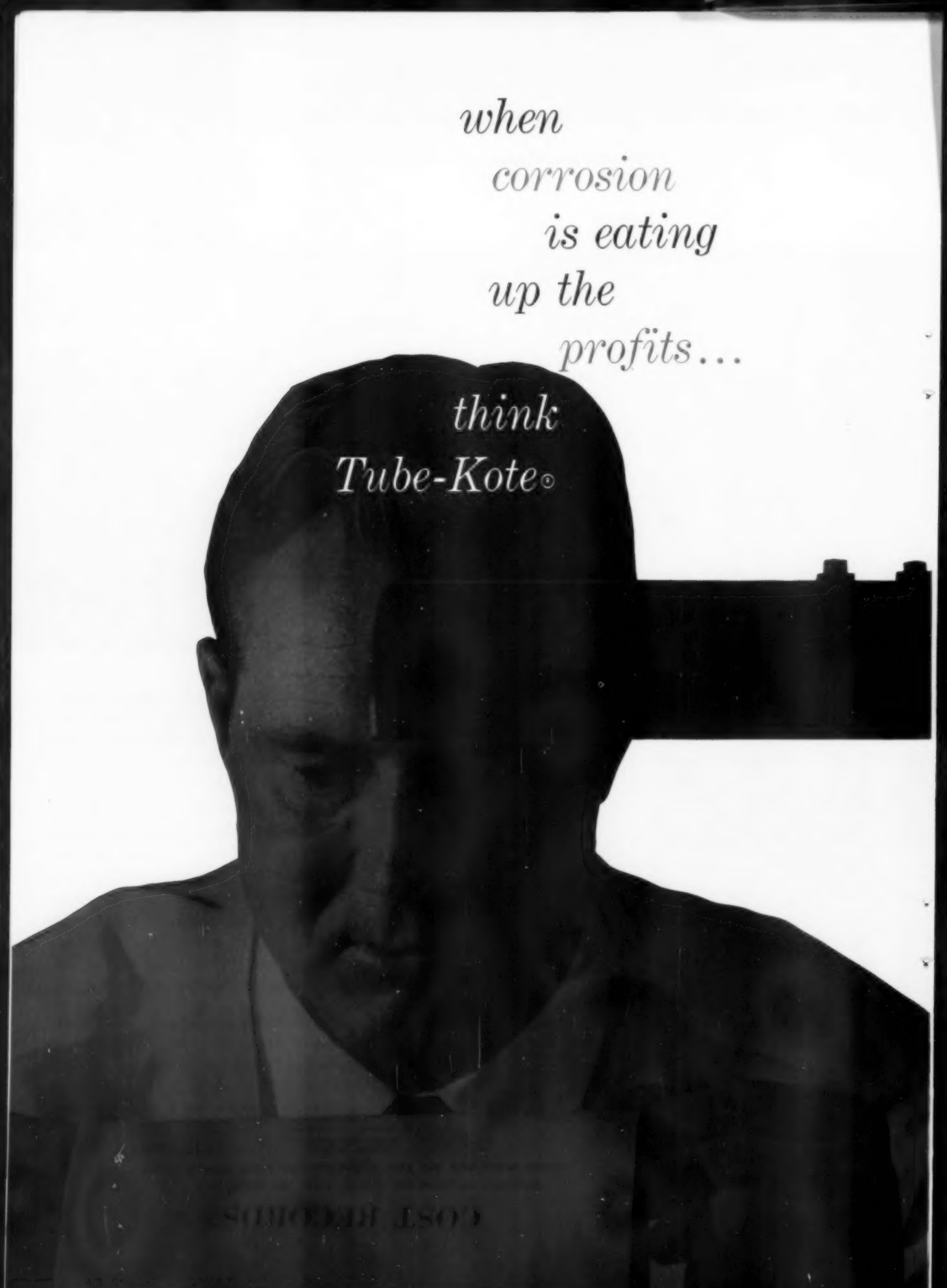
"And believe me," Captain Smith continues, "diesel engines operating under the exacting conditions found on a mud delivery vessel, such as the 'Mr. George,' get a real test for endurance and efficiency."

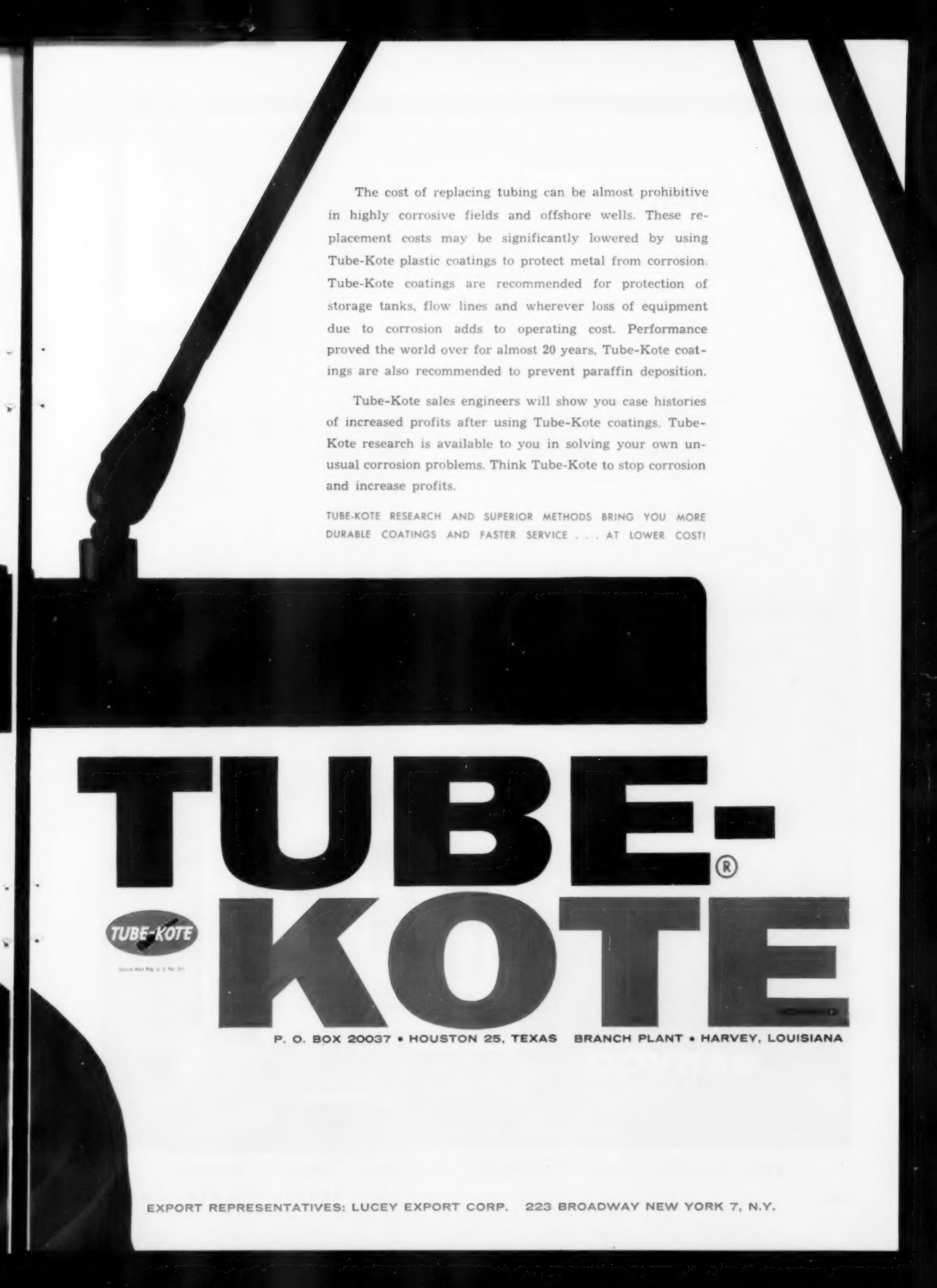
Power for equipment aboard the *George L. Ratcliffe* is furnished by two Allis-Chalmers Model 2505 diesels, each driving a 250-kw generator. There are two electrically driven outboard propulsion units with 54-inch diameter by 30-inch pitch propellers. These units are unique in that they can be rotated independently through 360 degrees and are reversible. Using them alone, the craft can be brought into position, held while mud deliveries are made, then backed away from the rig.

When the "Mr. George" went into service, it joined the growing fleet of Allis-Chalmers-powered vessels serving off-shore rigs. Before you specify an engine or generator set for any craft, see your Allis-Chalmers dealer for help in selecting the best unit for the job.

ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS


when
corrosion
is eating
up the
profits...
think
Tube-Kote®



The cost of replacing tubing can be almost prohibitive in highly corrosive fields and offshore wells. These replacement costs may be significantly lowered by using Tube-Kote plastic coatings to protect metal from corrosion. Tube-Kote coatings are recommended for protection of storage tanks, flow lines and wherever loss of equipment due to corrosion adds to operating cost. Performance proved the world over for almost 20 years, Tube-Kote coatings are also recommended to prevent paraffin deposition.

Tube-Kote sales engineers will show you case histories of increased profits after using Tube-Kote coatings. Tube-Kote research is available to you in solving your own unusual corrosion problems. Think Tube-Kote to stop corrosion and increase profits.

TUBE-KOTE RESEARCH AND SUPERIOR METHODS BRING YOU MORE DURABLE COATINGS AND FASTER SERVICE . . . AT LOWER COST!

TUBE-KOTE®

TUBE-KOTE

P. O. BOX 20037 • HOUSTON 25, TEXAS BRANCH PLANT • HARVEY, LOUISIANA

EXPORT REPRESENTATIVES: LUCEY EXPORT CORP. 223 BROADWAY NEW YORK 7, N.Y.

SERVCO PILOT MILL

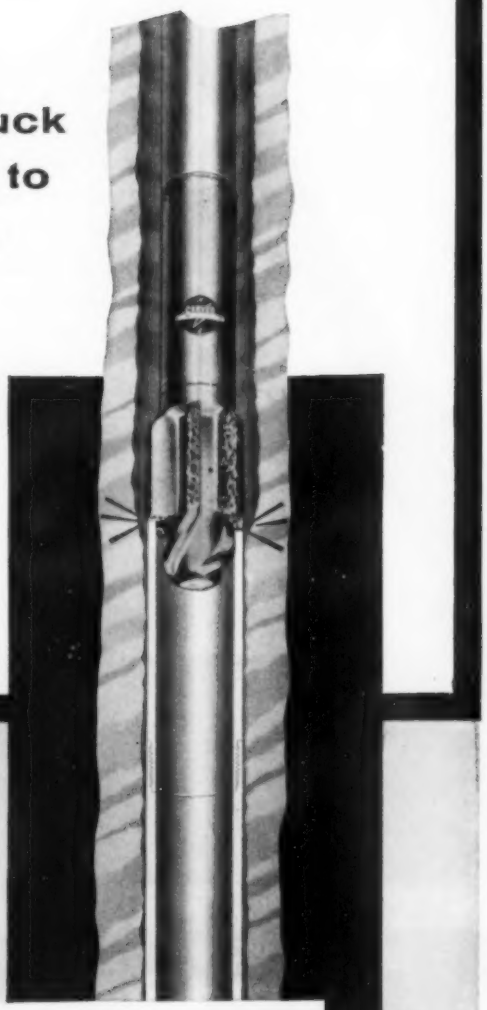
reduces 202 feet of stuck 7", 26#, N-80 wash pipe to 5,252 lbs. of shavings

in 19 hours!

New Servcoloy* dressing material has completely changed thinking in downhole milling operations!

Until recently few drilling contractors ever considered milling up stuck wash pipe. Now, however, they are doing it regularly and at phenomenal milling rates...using Servco Pilot Mills dressed with Servcoloy. No longer is it necessary to inside cut, run spears and jars. All you need to do the job quickly and efficiently is a Servco Pilot Mill and operator. This revolutionary new tool not only mills wash pipe, but also safety joints, cross over bushings and rotary shoes.

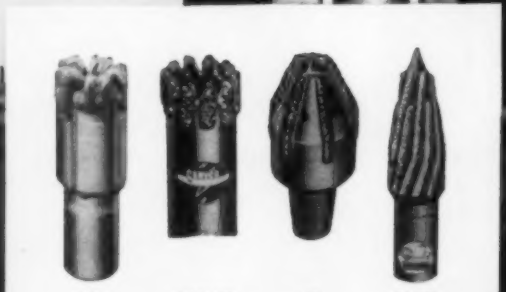
*Patented



ACTUAL JOB DATA WHERE SERVCO PILOT MILLS WERE USED...

Csg. Wt. & Grade	Total Footage Milled	Milling Time Hrs.	Milling Time Min.	Avg. Footage Milled per Hr.	No. Mills Reqd.	Depths
7⅝" 33.70# N-80	110.5*	53	05	2.1	4	Below 12,500'
7⅝" 29.70# N-80	103**	28	07	3.6	2	Below 13,000'
7" 26# N-80	82	14	40	5.8	2	Below 10,000'
7" 26# N-80	202***	18	48	10.6	2	Below 14,000'

*Includes milling bottom half of safety joint and cross over bushing.
**22° angle directional hole.
***Includes milling rotary shoe.



JUNK MILLS | ROTARY SHOES | CP MILLS | TAPER MILLS

For actual job reports or other information write to

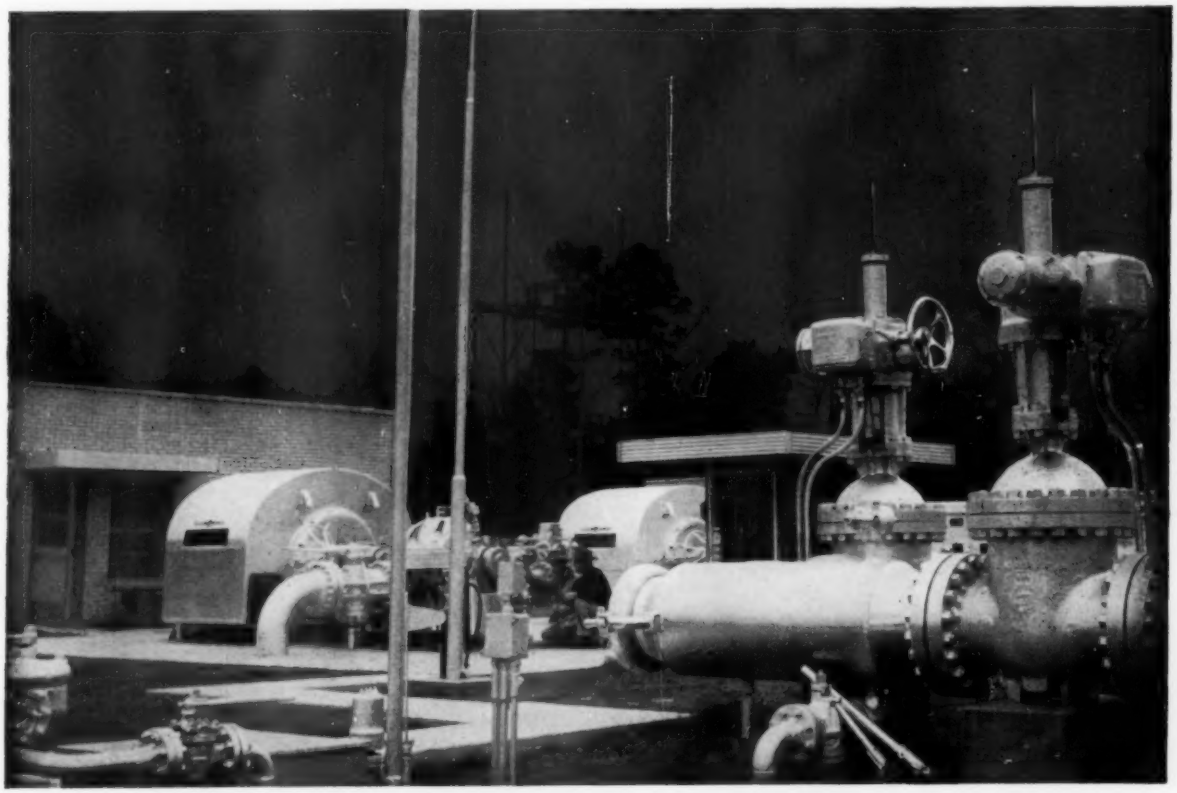
SERVCO

4850 Gasmer Street, Houston 35, Texas

General Offices: Long Beach, California; 2450 Cerritos

Field Offices: VENTURA • BAKERSFIELD • LAFAYETTE • HARVEY • EDMONTON

PIPE LINE PUMPING MAKES WONDERFUL CHANGE WITH ELECTRIC POWER



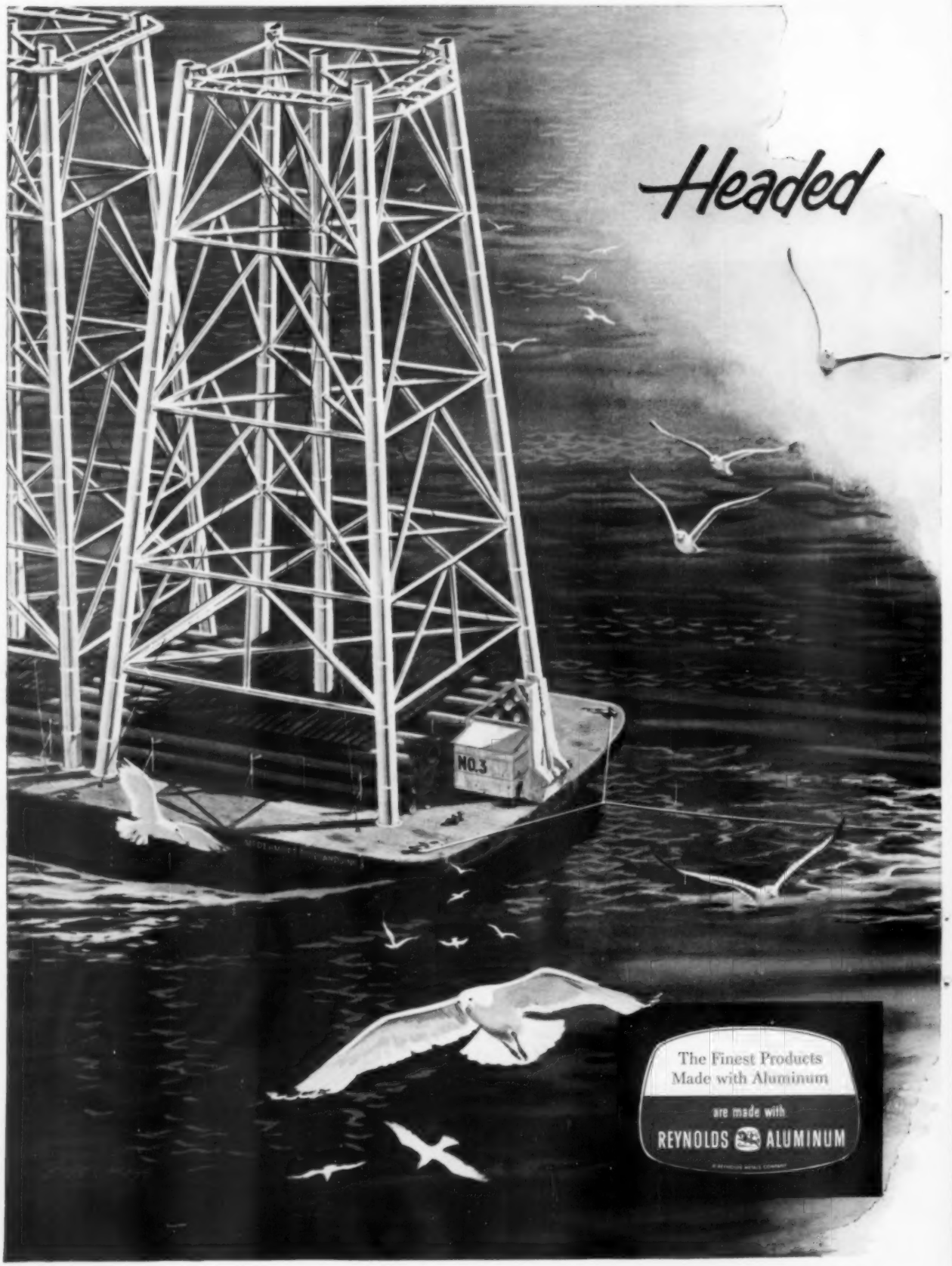
Operated by Remote Control

There are over 686,000 miles of pipe line throughout America today – three times the total U.S. railroad trackage. Reason for this big boom is economy of transportation. Closely linked with the economy picture is UTILITY ELECTRIC POWER – the power that has made push-button, fully automatic pipe line operation possible. When you have deliveries to make on schedule – at low cost – without the usual worries of station down-time, etc. – USE UTILITY ELECTRIC POWER. It's the sure way to be modern, more progressive and make more money.

I'M LCP – Low-Cost Power on the Job 24 Hours Daily

PETROLEUM ELECTRIC POWER ASSOCIATION

P. O. BOX 35006 DALLAS, TEXAS


Headed
NO.3
The Finest Products
Made with Aluminum
are made with
REYNOLDS ALUMINUM

Corrosion Fighters

for the bottom of Lake Maracaibo

Prefab oil drilling structures of Reynolds Aluminum last 5 to 9 times longer, prove aluminum for many applications

Out of Morgan City, Louisiana, bound for Venezuela, barges are carrying a new concept in underwater oil drilling: prefab aluminum structures that are installed in two days—that can be salvaged and moved to new locations—that resist corrosion 5 to 9 times better than the metals first used in Maracaibo's brackish waters.

These aluminum structures are also saving money. That's because they are erected faster than concrete structures, with less site labor—and turn installation time into production time.

The new aluminum structures have real meaning to other industries as well. They spotlight the durability—under the toughest conditions—of this light, strong, corrosion-resistant metal. They dramatize the great savings in installation, construction and maintenance made possible by aluminum.

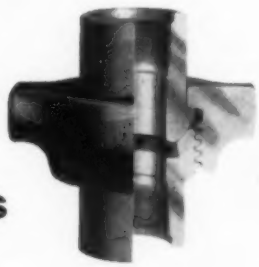
Reynolds Metals Company worked with the J. Ray McDermott Co., Inc. to develop these cost-cutting drilling structures, just as Reynolds has worked with manufacturers in many fields. If you're looking for ways to improve your product or production, consider aluminum. And for help in design, production—even for parts fabrication—call on Reynolds. Phone your nearest Reynolds Office or write *Reynolds Metals Company, P.O. Box 2346-CR, Richmond 18, Virginia.*

Watch Reynolds All-Family Television Program, "DISNEYLAND", ABC-TV.

REYNOLDS ALUMINUM

...the metal for automation

Pour it on!



THOSE WECO UNIONS

WILL HOLD IT! That's right, WECO Unions will hold the high pressures of today's — and tomorrow's — service jobs without leaking. Full-circle metal-to-metal contact sealing is always maintained by WECO's ball and cone seats. The strong forged steel nuts and subs can take the hard treatment of fast make-up and high-pressure shock and vibration.

You can rely on WECO Unions for your well service work and rig piping. See your WECO salesman or order from your Supply Store today . . . available in sizes 1" through 12", in pressures from 1,000 through 15,000 psi.

U-3-58

WECO®

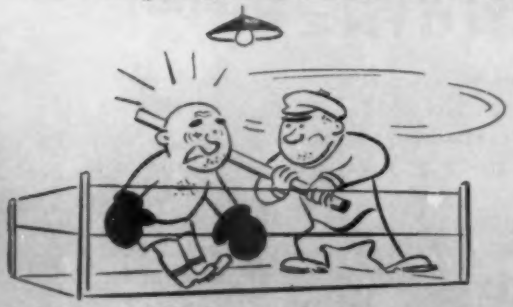
WELL EQUIPMENT MFG. CORP.

HOUSTON, TEXAS

Division of CHIKSAN COMPANY *a subsidiary of* FOOD MACHINERY AND CHEMICAL CORPORATION

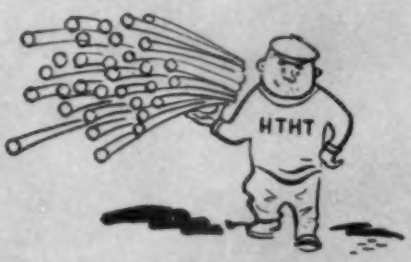
Naugatuck KRALASTIC

Lightweight with heavyweight stamina



Kralastic® Plastic Pipe is impact-resistant. It resists damage from tools, rocks, and the roughest of handling. It's so tough you not only can slug somebody with it—you can actually drive a nail with it.

Kralastic is a favorite where chemicals have to be handled. It handles corrosive liquids in chemical, paper, food-processing and water-treatment plants.



Light in weight, Kralastic is ideal for conduits for electrical wiring (same weight, more wires). Widely used for transporting potable water (N.S.F. approved).

Economical Kralastic stays economical because it lasts so long, is so easily and quickly installed. Make sure the plastic pipe you buy for high-pressure or high-temperature service is made of Kralastic HTHT—for your satisfaction.

Kralastic is the tough rubber-resin material (one of the first to produce plastic pipe) that has proved itself not only in natural gas lines, oil field pipe, and valves of any kind, but in hundreds of other tough applications, including water transmission lines.

Investigate Kralastic Pipe and learn more of its many advantages. For detailed particulars, write today to the address below.

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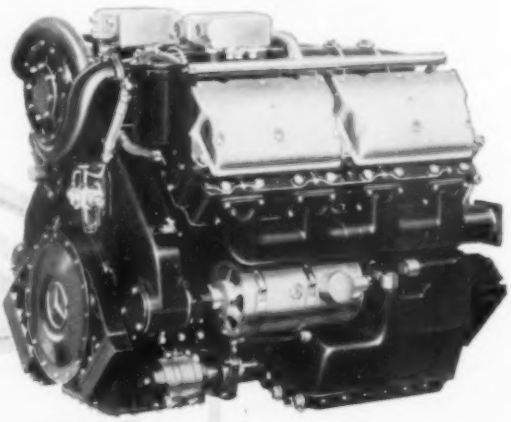

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and matches ORIGINAL EQUIPMENT

COLORS

Distinctive as your own fingerprint. Accept no substitute.

How much does rusty equipment cost *you?* With Rust-Oleum, you STOP RUST—and you match original equipment colors, too, for long-lasting protection!

We want you to see for yourself how *easy* it is to use Rust-Oleum . . . actually take the brush and see how smoothly it works, how it dries to an *attractive, high-gloss finish* that resists sun, fumes, rain, heat, snow, salt air and salt spray, and blowing dust and sand. And the same formula can be applied by brush or spray. Just check the coupon for the color you want . . . and attach it to your business letterhead for a FREE TEST SAMPLE. No cost or obligation.

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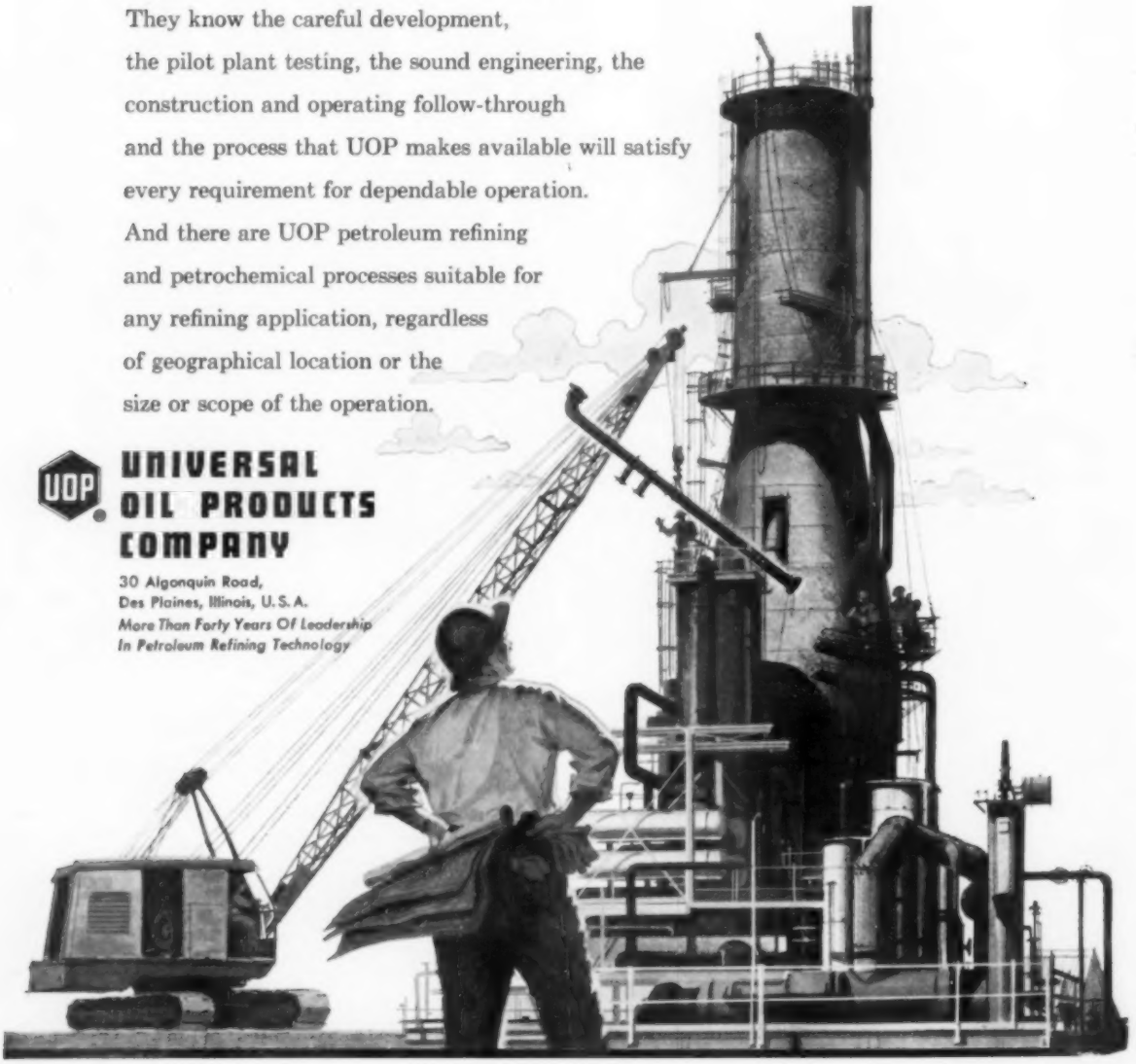
When your business depends on a refining process . . . you can depend on UOP

Proper functioning of new processing equipment is important to every established refiner—large or small. But to the "grass roots" refiner—who has built a new refinery from the ground up—it is a matter of survival. This is the reason so many "grass roots" refineries are based on UOP processes—for refiners the world over have learned to rely on Universal to come through when the chips are down. They know the careful development, the pilot plant testing, the sound engineering, the construction and operating follow-through and the process that UOP makes available will satisfy every requirement for dependable operation. And there are UOP petroleum refining and petrochemical processes suitable for any refining application, regardless of geographical location or the size or scope of the operation.



UOP

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More Than Forty Years Of Leadership In Petroleum Refining Technology

Do you have your copy?

It's Bethlehem's new Handbook, completely revised to include specification data on both electric resistance-weld steel pipe and continuous butt-weld pipe. Line Pipe, Standard Weight Pipe, Drive Pipe, Water Well Casing—it's all here and more, plus abstracts from Specifications ASTM A 120-54 and ASTM A 53-55 T.

For *usable* data on steel pipe manufactured on the finest equipment and with the utmost skill and processing know-how, send for your copy of Bethlehem's up-to-the-minute Handbook. Just clip the coupon.

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Please send me your newly revised *Handbook of Tubular Products* (No. 393-B) which contains specification data on electric resistance-weld and continuous butt-weld steel pipe.

*Name*_____

*Title*_____ *Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

Three little future accountants seem to be amazed at the figures their father is showing them in the family budget. Their father and mother, Mr. and Mrs. Richard Baer, through long experience, appear able to take the budget more in stride. Mr. Baer is an accountant in the General Office of Standard Oil Company where Standard's annual budget is prepared.

Where does the money go?

REVIEWING FAMILY BUDGETS, pleasant or not, is a task every family has to face at some time. And every business, too. In a way, company finances are a lot like personal financial problems. Companies, too, must watch the pennies. Like you, Standard Oil and its subsidiary companies took in a certain amount of money last year. And here's what happened to it.

You are welcome to a copy of our 32-page 1957 Annual Report. Just write to Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

1. Things we bought and used...59.5%

Most of the money we took in went for things we had to buy, such as crude oil, materials and services, plus charges made for wear and tear. These costs are roughly comparable to your living expenses. We buy everything from paper clips to structural steel from more than 32,000 independent companies in hundreds of American communities. While our costs have skyrocketed in the past few years, prices of oil products have gone up only slightly in the same period!

2. Taxes paid...18.7%

Our next biggest item—even bigger than our payroll—was for taxes, including our own taxes, and those we collect from our customers for national, state and local governments. All together this totaled $447,048,487. And that figure does not include the many "hidden" taxes everyone pays!

3. Wages, salaries, benefits...15.5%

Then there were wages, salaries and benefits for our 49,680 employees. Standard Oil employees enjoy one of the most progressive benefit programs in any industry. Back in 1903, when retirement plans were virtually unheard of in industry, Standard Oil started its retirement plan. It was among the first industrial companies in America to do this.

4. Profits used for improvement...4.0%

After all costs of doing business were taken care of, 6.3% was left. This is profit. We used part of this, or 4.0% of our total income, to expand facilities and to improve our products and services for the millions of people who depend on us for petroleum products.

5. Profits paid to owners...2.3%

The balance, or 2.3%, went as dividends to our 148,400 shareholder-owners. Standard Oil has paid dividends for 64 consecutive years. The value of dividends paid in 1957, including a special fourth quarter dividend, was $2.11 per share. We try to pay share owners a dividend equal in value to approximately half of earnings each year, reinvesting the remainder for future growth in the interest of shareholders, employees and the public.

6. And that's where our money went!

All the money we took in has been accounted for. At our service stations, our plans and investments face the final test, for our millions of customers are the bosses. Through our subsidiaries, we serve all America. Our products are sold in 48 states.

What makes a company a good citizen? To be a good citizen a business must be frank and open—with employees, stockholders, customers, the public. In advertisements like this during the year, we at Standard Oil publish reports to our neighbors so you will know how we work, something about our Standard Oil family, where our money goes, and the part we play in the prosperity of the communities in which we live and work.

STANDARD OIL COMPANY
(INDIANA)
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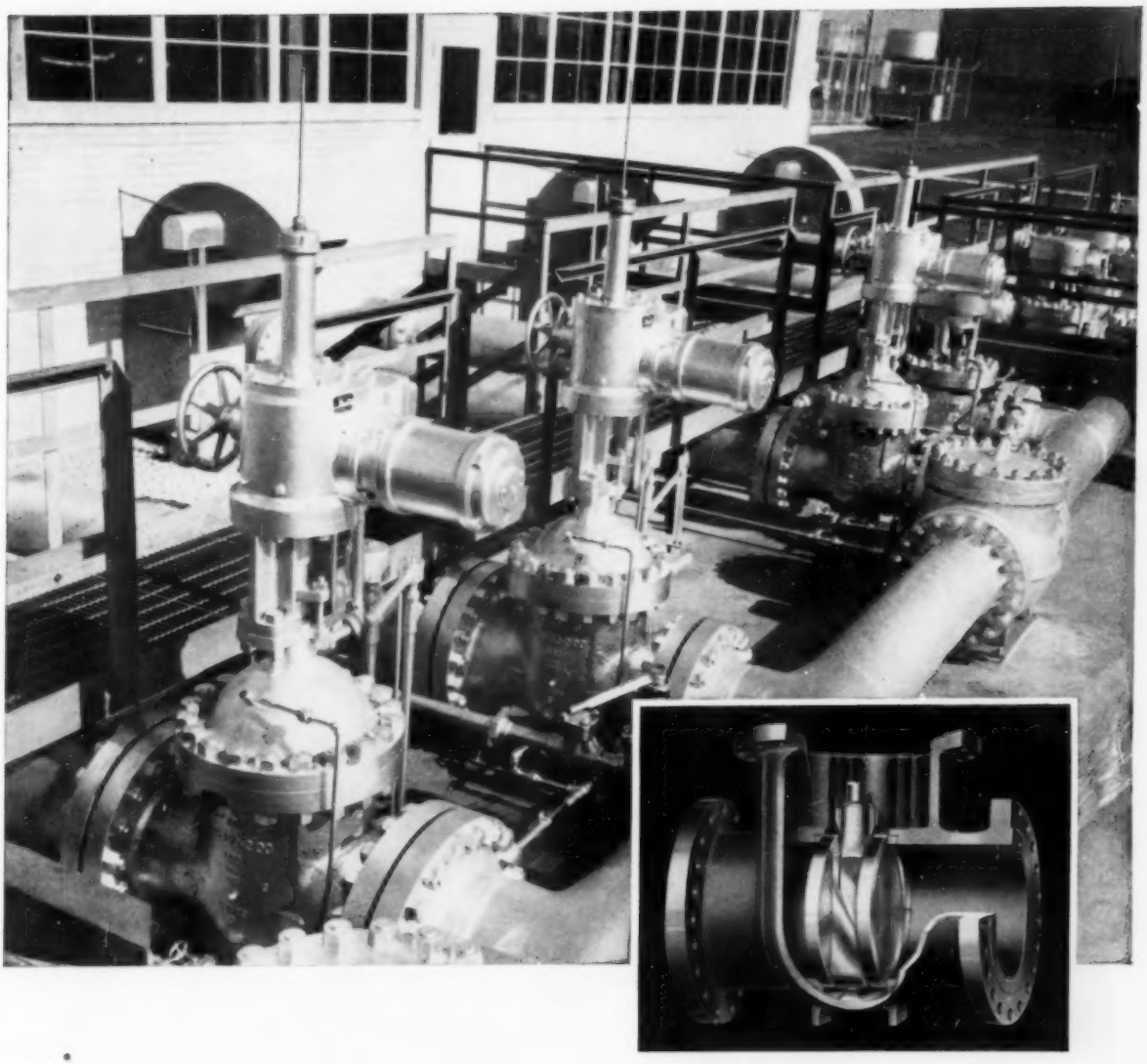
THE SIGN OF PROGRESS...
THROUGH RESEARCH



Why Darling revolving double disc gate valves mean . . .

permanent good behavior!

THE reason is very simple. These valves are different! They were designed with one objective uppermost—to be uneffected by the very conditions that lead to trouble in ordinary gate valves. And so it was that Darling came up with the fully revolving double disc, parallel seat principle. It minimizes friction and avoids wear concentration. It assures remarkably easy operation with self adjustment for positive closure. It automatically compensates for any valve body deflection.

The proved result is that these Darling valves consistently show superiority in service life, low maintenance, positive operation and trouble-free performance. Savings naturally result. Write for Catalog No. 57.

DARLING VALVES

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

Build like this...anywhere, anytime at modest cost...without delay or red-tape

Spacious column-free interiors have superior ventilation, illumination and temperature control characteristics. These are just a few of the other advantages the Butler Building System offers. Note convenient mezzanine over offices.

Many companies have found a simple way to eliminate the costly, time-consuming work required to plan and build the facilities they needed in different parts of the country to serve the rapidly expanding oil industry.

First, they standardized building design with Butler building components. Then, they turned construction over to the nationwide network of Butler Builders.

By utilizing the Butler Building System they were able to enjoy the many advantages this method of construction offers over traditional building methods. Economically mass-produced, pre-engineered Butler components eliminated routine engineering, time spent checking specifications against local building codes, costly custom-fabrication.

The Butler Builders' trained erection crews, working with precision-made, pre-punched, die-formed components were able to erect and finish building weeks—even months—sooner than traditional building methods would have permitted.

Get the full story on how the Butler Building System and the Butler Builder organization can help you solve construction program problems. Your Butler Builder is listed in the Yellow Pages of your phone book under "Buildings" or "Steel Buildings." Or write direct.

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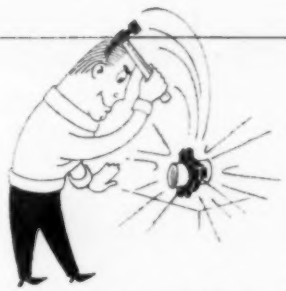
Rocky tells why the Rockwood 603A makes-up without galling

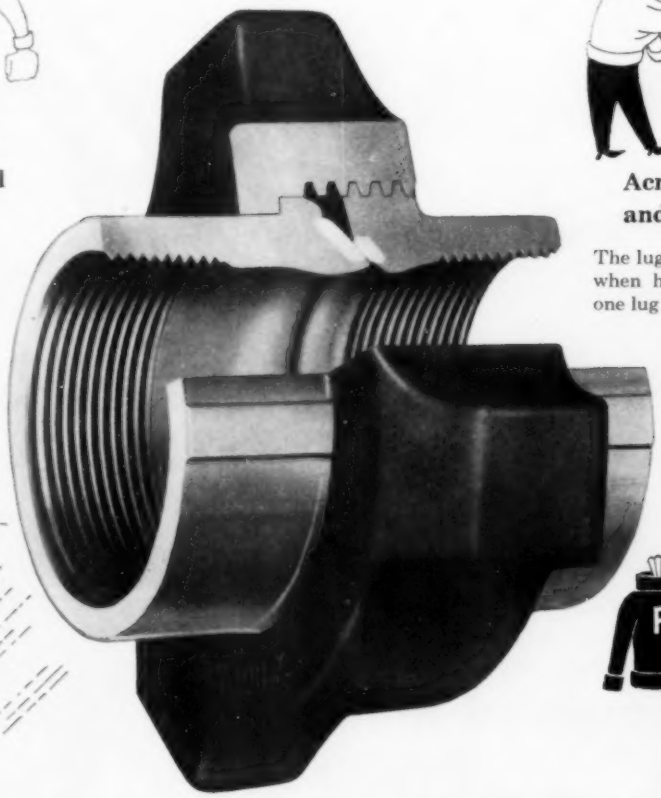


Hardness Differential assures tight seal

The male seat of the 603A is especially treated to make it 150 Brinell harder than the female seat. That means no galling in "make-up." Both seats are made of corrosion-resistant AISI molychrome steel.

Acme Speed Thread and nut extra strong

The lugs will not deform — even when hit with a hammer! And one lug is in position at all times. These speed threads also assure quick "making" and "breaking" in service.



"Rockwoodizing" assures corrosion protection

A special coating process, applied after threading, protects the entire union including the quick-opening Acme thread from corrosion.

Exclusive cold forging process assures interchangeability

Rockwood's exclusive cold forging process results in completely interchangeable parts and higher resistance to tough working conditions.

Get the Union with hardness differential

Strength, interchangeability, corrosion-resistance, Acme speed threads — name it and the Rockwood 603A Tri-Lug Union has it.

Write for complete information. Mail coupon today. The Rockwood 603A Union is tested and listed by Underwriters' Laboratories, Inc.

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1500 psi operating pressure
Control valves permit multiple cylinder operation simultaneously
Reach below grade 10', behind rear axle 14' 4", loading height 7' 2"
140° arc of swing
Self equalizing, independently operated stabilizers

in an improved model– the BOBCAT

There are many reasons why the "good old," dependable Sherman "C" was so well liked by excavators and why the new Bobcat will be even more popular–

- The Bobcat has a fast operating cycle, moves earth quickly and economically.
- The Bobcat is extremely stable particularly when working directly behind the tractor where 90% of all digging is done.
- The Bobcat digs close to the tractor, permitting easy maneuverability in tight places.
- The Bobcat is mounted close to the tractor controls, making it easy for the operator to change tractor positions and adjust throttle settings.
- The Bobcat will have a high trade-in value because used Shermans are in big demand.
- The Bobcat is sold and serviced by Ford Tractor Dealers so parts and service facilities are always close at hand.

Ask your Ford Tractor Dealer for a demonstration of the low cost Bobcat on *your* job.

Write today for Bulletin No. 1581

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POWER DIGGERS • LOADERS • FORK LIFTS
SOIL WORKING TOOLS • CRANES AND EXCAVATORS

DU PONT *Petroleum Chemicals* NEWS

Number 88 in a Series of Bulletins for the Petroleum Industry

JUNE 1958

$20 worth of FOA-2 saves $800 mechanical de-sludging job...with no downtime

Chemical industry's demand for oil grows

"Dacron"* an example of volume consumption

Uniforms of DuPont "Dacron" polyester fiber have been widely adopted for service station attendants. The garments are remarkably acid-resistant, can be washed or dry-cleaned, and are unusually durable. What's more they *hold* creases, *resist* wrinkling, *stand up* under the rigorous routine of the busy service station.

Huge quantities of other synthetic fibers, such as nylon, also are made from oil. In fact, petroleum products have in recent years become such an important source of raw materials that many chemical companies, DuPont included, have located plants in refining areas so as to be near an ample source of petroleum-derived raw materials.

*"Dacron" is DuPont's registered trademark for its polyester fiber.

When sludge fouls oil storage tanks, filters, strainers, lines and nozzles, there are two remedies. One is to remove the sludge mechanically and manually. This means downtime and considerable other expense.

The alternate way is to clean the system chemically. This is far cheaper, and there's *no downtime* involved.

The economy and effectiveness of this method are exemplified by a recent case history:

DuPont FOA-2 is added to residual fuel as it's pumped into sludge-laden tank.

A power plant serving two industrial laboratories burns between 1,000 and 1,500 gallons of residual fuel daily, drawn from a 50,000-gallon storage tank.

6 inches of sludge

Recently, it was discovered that six inches of sludge had accumulated in the bottom of the tank.

A tank cleaning firm was called in. A firm estimate of $800 was obtained for cleaning the tank mechanically. Considerable downtime would be required.

But since a constant temperature

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

DUPONT *Petroleum Chemicals* NEWS

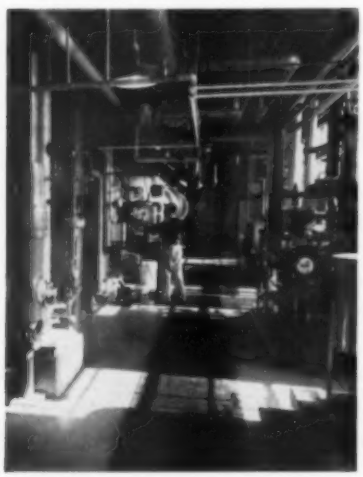
CONTINUED

$20 Saves $800

had to be maintained in the laboratories, the power plant could not afford the downtime. Looking for an alternative, the power superintendent decided to try dispersing the sludge with DuPont Fuel Oil Additive No. 2 (FOA-2).

Constant operation

$20 worth of FOA-2 was added with the next load of fuel oil delivered. A week later, no sludge could be detected. And the tank was in continuous use during the clean-up period.



THIS IS THE POWERHOUSE that had to maintain service, so that essential temperature control, in the laboratories it served, could also be maintained.

At the end of the week, throughout which time boiler room operations were completely trouble free, it was found that the entire sludge accumulation had been dispersed and burned with the fuel.

Sludge prevention

In addition to sludge removal, *prevention* of sludge formation is another important function of DuPont FOA-2. It is an excellent stabilizer and solubilizer, as well as a dispersant, for all types of fuel oils.

Being nonmetallic, this additive burns completely with the fuel, leaving neither ash nor other residue.

For more detailed information about DuPont FOA-2 and its use as a tank-cleaning agent, get in touch with one of our sales offices listed at right. They have a new FOA-2 booklet, and Technical Memorandum 317 which contains a number of case histories.

How one refinery solves residual sludge problems with Du Pont FOA-2

In the heating plant of a midwest refinery, residual fuel with 40% BS&W, most of which was "coke," was being used. Frequent cleaning of the storage tank was required to prevent the nozzles from clogging and the burners from flaming out.

FOA-2 tried

Following one of the clean-outs, DuPont Fuel Oil Additive No. 2 (FOA-2) was added to the incoming oil stream to disperse sludge residue and stabilize the fresh oil supply.

BEFORE FOA-2—This picture shows a typical instance of nozzle fouling caused by sludge in residual fuel.

AFTER ADDING FOA-2—Nozzles stay clean, burner operation is improved, and tank contents remain free of sediment.

The results were gratifying. After the additive was used for three weeks, there was no detectable sludge in the storage tank. Normally in this length of time the sludge level would have built up in the tank sufficiently high to cause pumping difficulties.

Flame pattern improved

When the burners were examined, the flame pattern was found to be better. Also, fewer ash deposits were found in the furnace and the over-all burner operation was improved.

This money-saving improvement and the elimination of frequent, costly cleanings resulted from the highly efficient dispersing, stabilizing and solubilizing qualities of DuPont FOA-2. It can equally well improve the distillate fuel oils you sell or use yourself.

A recently-published booklet on FOA-2 contains all the basic information on the many varied applications of FOA-2. There is also a bulletin of case histories that you will find of interest — our Technical Memorandum No. 317. You can obtain this literature by writing or contacting the nearest DuPont Petroleum Chemicals Division sales office.

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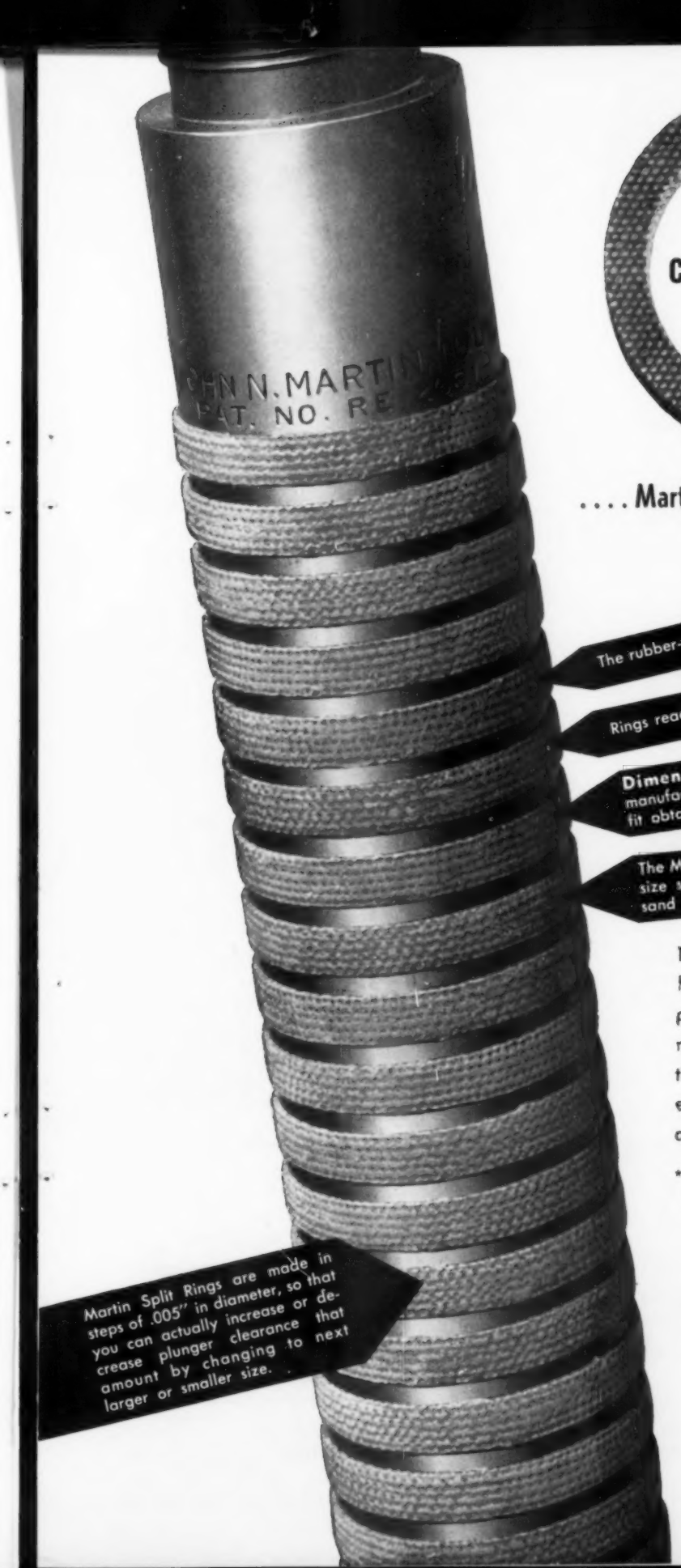

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The rubber-and-duck rings swell **just so much** and no more.

Rings reach maximum size in the well within a few hours.

Dimensional Compensation during the manufacturing process assures the uniform working fit obtained with Martin Split Rings.

The Martin Ring Size Guide Table* assures proper ring size selection for various gravities, temperatures and sand and water content.

Martin Split Rings are made in steps of .005" in diameter, so that you can actually increase or decrease plunger clearance that amount by changing to next larger or smaller size.

The gaps between the Martin Rings cause fluid turbulence which slows down slippage past the Martin Plunger — just as a rough road slows down your driving speed. Actually, the Martin Plunger maintains pumping efficiency with a looser fit than is possible with a smooth surface plunger.

* See the complete Martin Catalog and instructions in the 1957 Composite Catalog.

JOHN N. MARTIN
Manufacturer
9 W. BRADY • TULSA, OKLA.

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and their economy is a guarantee . . . not a possibility

The "C-19," "C-19C," and "C-20" Casing Heads offer flexibility, because they meet every well completion condition . . . they offer economy because of safety and rig-time saving.

The "C-19" and "C-19C" offer economy because load capacity is twice as great as conventional slip hangers, because

- Openhole Hazards are eliminated
- Slips bite evenly
- Removal of blowout preventers before casing is suspended is eliminated

The "C-19" and "C-19C" save rig time because

- Installation is simple and thus rapid
- Sealing element, slip bowl, slips assembled as a single unit
- Seal is automatic
- No field welding is required

The "C-20" for medium depth wells is quick-setting, positive sealing. Same advantage of the heavier C-19 series is offered.

The Oil Center Tool Company stays abreast of oilfield problems.

Type C-19 Hanger in open position

Type C-20 Hanger in open position

where progress is a daily practice

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NOW- shorter by 5 3/16 inches!

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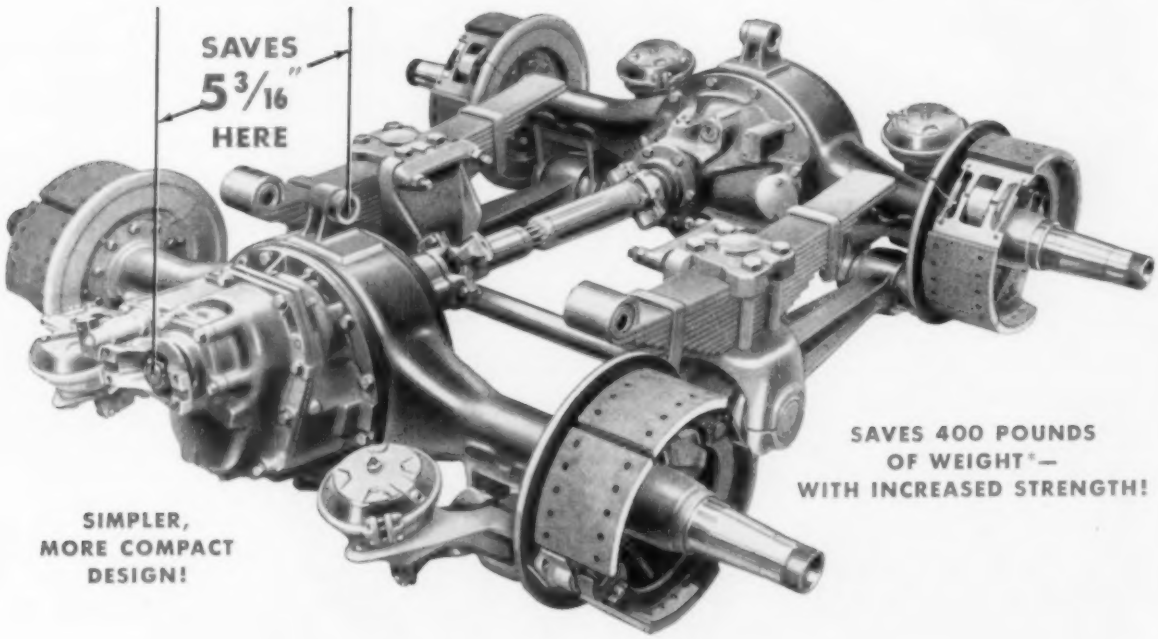

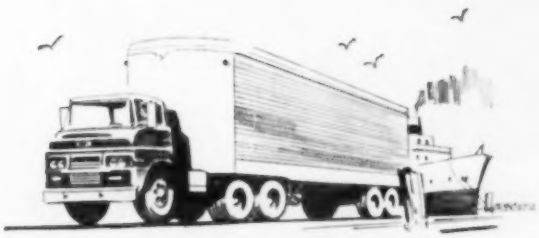

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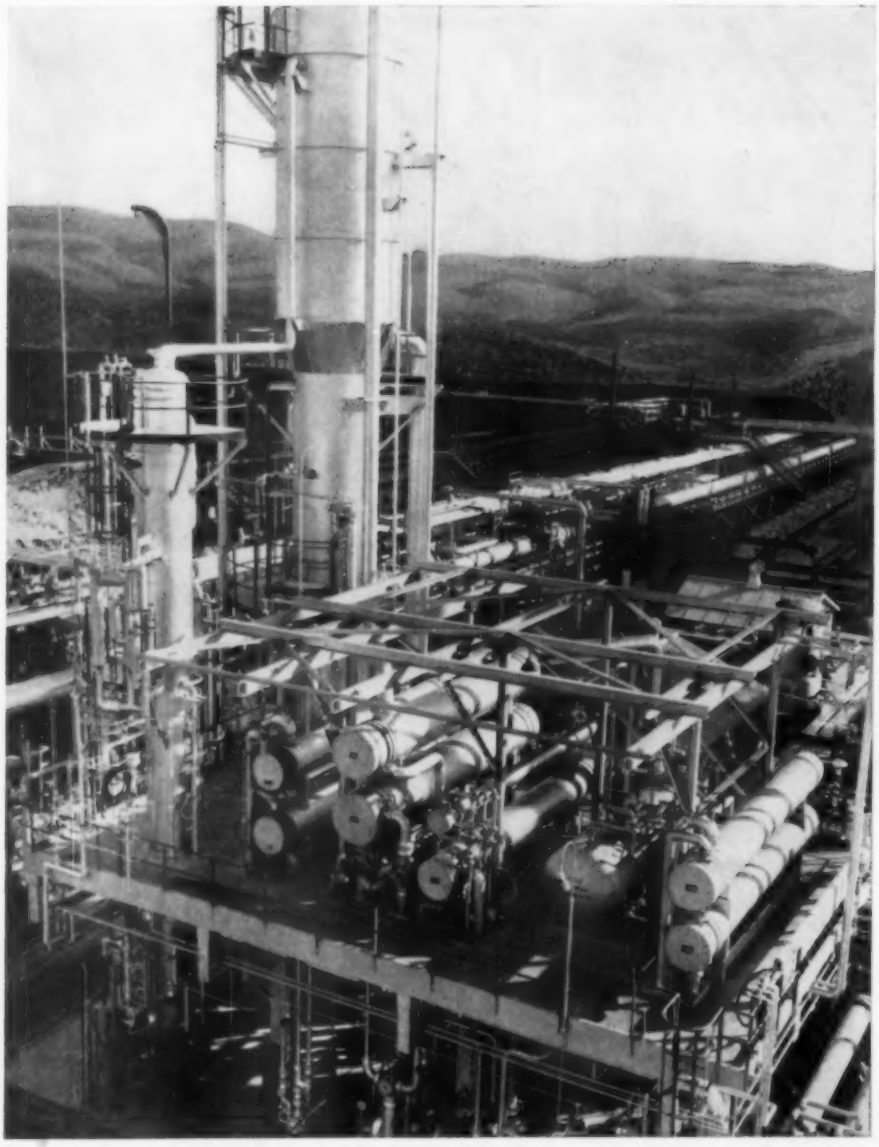

Oleum Refinery, Union Oil Company, California. Large topping column is of stainless steel with stainless trays and caps. Smaller stripping column and heat exchangers are of carbon steel. Diameters of exchangers range up to 36".

ON STREAM AT UNION OIL

YUBA ENGINEERED EQUIPMENT

What Yuba has done for Union Oil it can do for you... design and manufacture a *SINGLE UNIT* or equip an *ENTIRE SECTION* of a processing plant.

Yuba is geared to furnish heat exchangers, columns, towers, storage tanks, pressure vessels, expansion joints, and structural fabrication.

In the design of Yuba equipment many unique features have been incorporated. For example, Yuba heat exchangers for high temperatures and pressures feature the famous Multilok closure and welded tubes.

Plants conveniently located in East and West. May we have your inquiry?

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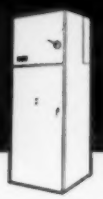
Newly designed
Type H Motor Control



Ultimate in protection

for men and machines

Here's the last word in control protection for personnel and equipment! It's all part of Allis-Chalmers newly designed, high voltage control.

And maximum protection is only one of the features of this new control line. You also get full-front access, smaller cabinet size (2.36 square feet less than competitive units), a completely tested unit, and ample panel space for optional features.

1. Gang-operated disconnect switch isolates starter from incoming power—assures safe entry to high voltage compartments.

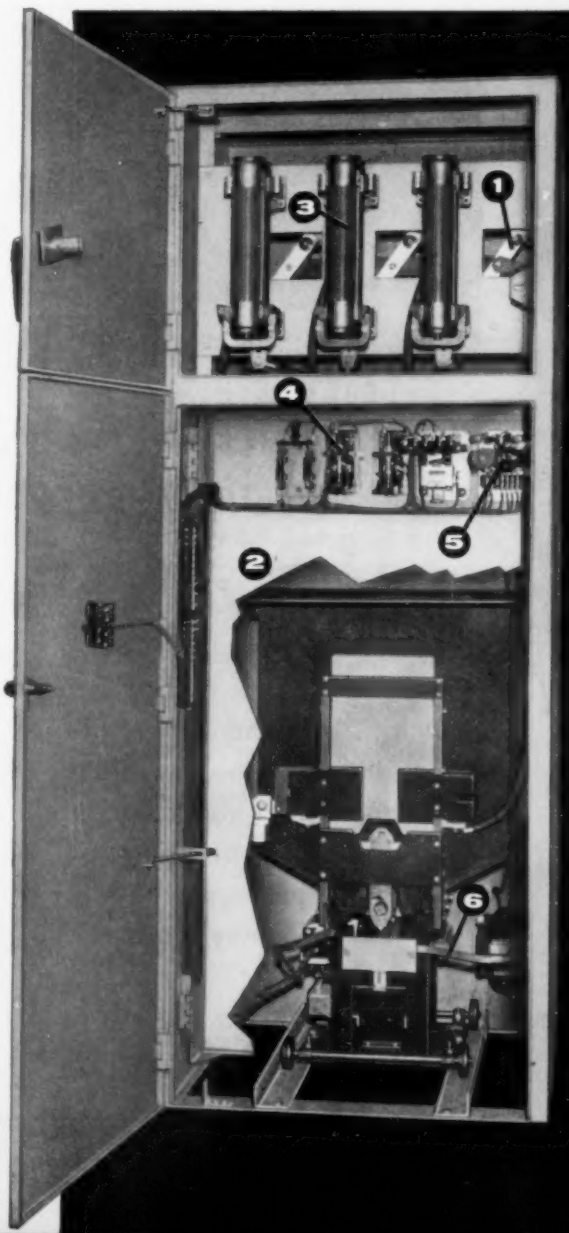
2. Steel cubicle separates high and low voltage equipment.

3. Short-circuit protection provided by fast-acting current-limiting fuses, rated 150,000 kva at 2300 volts and 250,000 kva at 4160 or 4600 volts.

4. Overload protection provided by accurate temperature-compensated thermal overload relays which trip only with excessive motor current, preventing needless motor stoppages.

5. Undervoltage protection instantaneously opens line contactor on loss of voltage. Time-delay undervoltage protection also available.

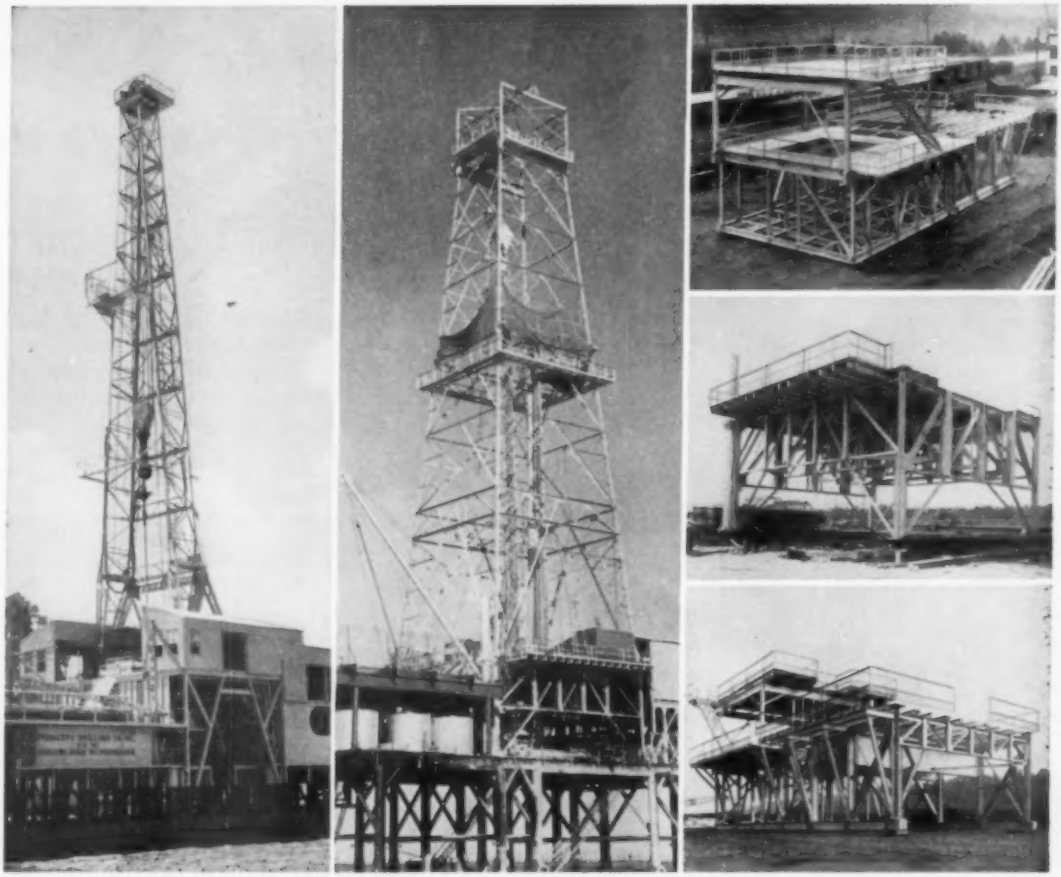
6. Mechanical interlock coordinates contactor, disconnect switch, outer door and inner control barrier for maximum safety.



This starter line meets every 2300 to 5000-volt motor need. Contact your A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-5521



OFFSHORE—INSHORE . . . STEEL STRUCTURES DESIGNED TO MEET YOUR SPECIFIC REQUIREMENTS

. . . Lee C. Moore has years of experience in designing and fabricating special steel structures for use on over-water platforms and barges, and can provide you with valuable assistance in selecting the right type and size structure for use with your next over-water unit . . . whether it be a barge for drilling in the marshlands of Louisiana . . . a giant mobile platform for the Gulf of Mexico . . . or a unit supported by concrete piling in Lake Maracaibo.

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They Say—

Canada's "Uncle of oil"

Dear Sir:

In Journally Speaking, May 12, (p. 71), you called James Miller Williams of Hamilton, Ont., the "Uncle of the oil industry." Congratulations on an apt choice of words. Actually, your statements are the fairest and clearest appraisal yet made in print of Williams' place in oil history on either side of the border.

Williams was undoubtedly a clever and enterprising businessman but his influence on the oil industry, as such, was limited considering the avalanche which began with the successful completion of Drake's first well. Certainly Williams had no influence on Drake or the Seneca Oil Co.

However, it is interesting to note that "Yankee" oil men had considerable influence on Canadian oil developments in the early and middle sixties. They came in such numbers to the Petrolia oil fields, in fact, that they eventually formed a fraternal organization called the Washington Lodge. The Fourth of July was the biggest local holiday and was celebrated with as much fuss and feathers as could be found south of the border. And after the Civil War, when Fenian raids began, the Americans pulled out and headed for the States, leaving Petrolia a veritable ghost town.

So the fortunes of the game threw oil men from both our countries together at an early date, and history records that we have been growing together steadily ever since.

And if we are celebrating our centennial this year, it is not an attempt to discredit "Col." Drake, but rather to mark the enterprise and vision of a Canadian pioneer whose accomplishments, though not as spectacular as those of Drake, were of equal importance to our own oil history.

John D. Brown
Editor
Oil/Gas World
Don Mills, Ont.

Dramatic hours in France

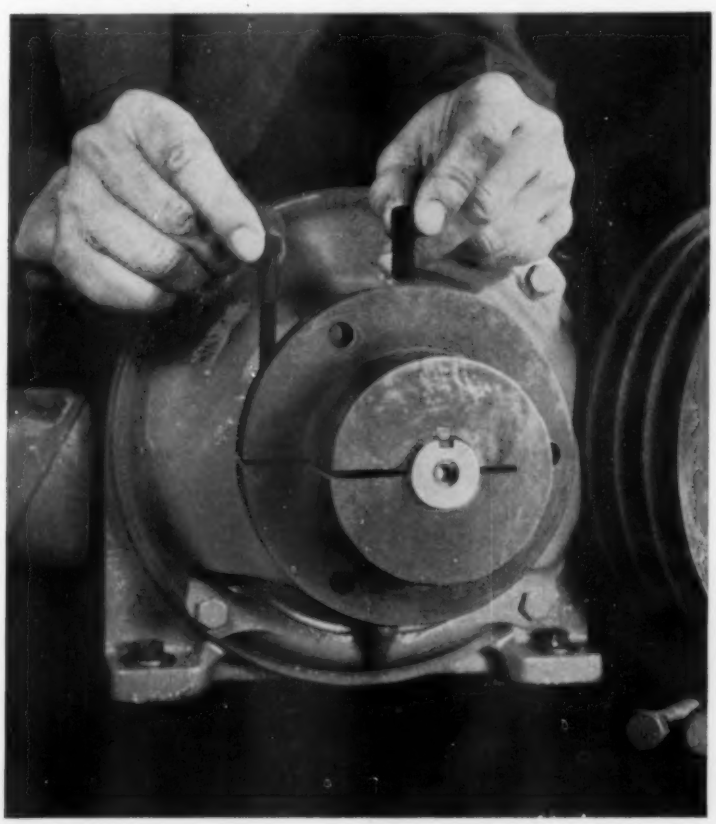
Dear Sir:

I beg to apologize for my delay in acknowledging your most kind and helpful April 30 letter. But you will appreciate that throughout those dramatic hours my country has been living I felt unable to do so.

Now the situation here seems somewhat less cloudy, as Gen. De Gaulle has proclaimed that he will respect the constitution of the land. There is no unbridgeable chasm between Algeria and the old home-country. On both sides, we French have been chary of provoking civil war.

The cloud has had even its silver lining, bringing together Frenchmen and Moslems in Algeria in the same patriotic fervor . . . It is up to the powers-that-be to follow up quickly with far-reaching social and political reforms, land-sharing programs, etc., to give Moslems the sense of belonging in the French community. Otherwise, this union would be very short lived.

The political upheaval has not in the least affected oil activities. Yesterday, the tanker Paul-Etienne loaded 14,800 bbl. of Hassi Messaoud crude at Algeria's Philippeville for transport to Morocco for treatment at the Ste.



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QD Sheaves these extra

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Only Worthington QD Sheaves offer the oil industry:

EASY ON two-piece sheave design for simple, rapid installation.

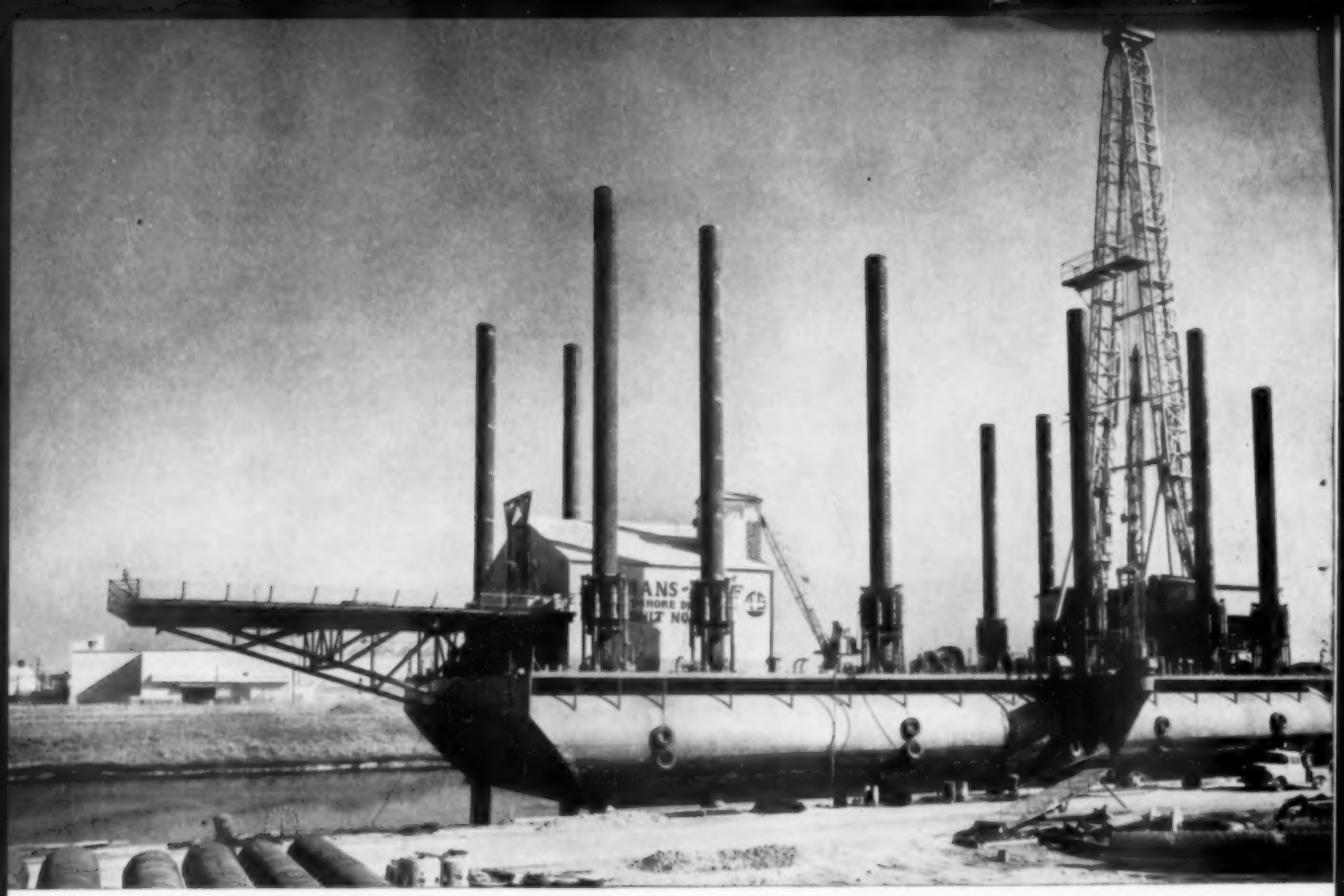
EASY OFF assembly for part-by-part removal.

ALWAYS TIGHT sheave construction for sure, safe positioning.

COMPLETE STOCK and service available anywhere in the oil industry from over 350 distributors.

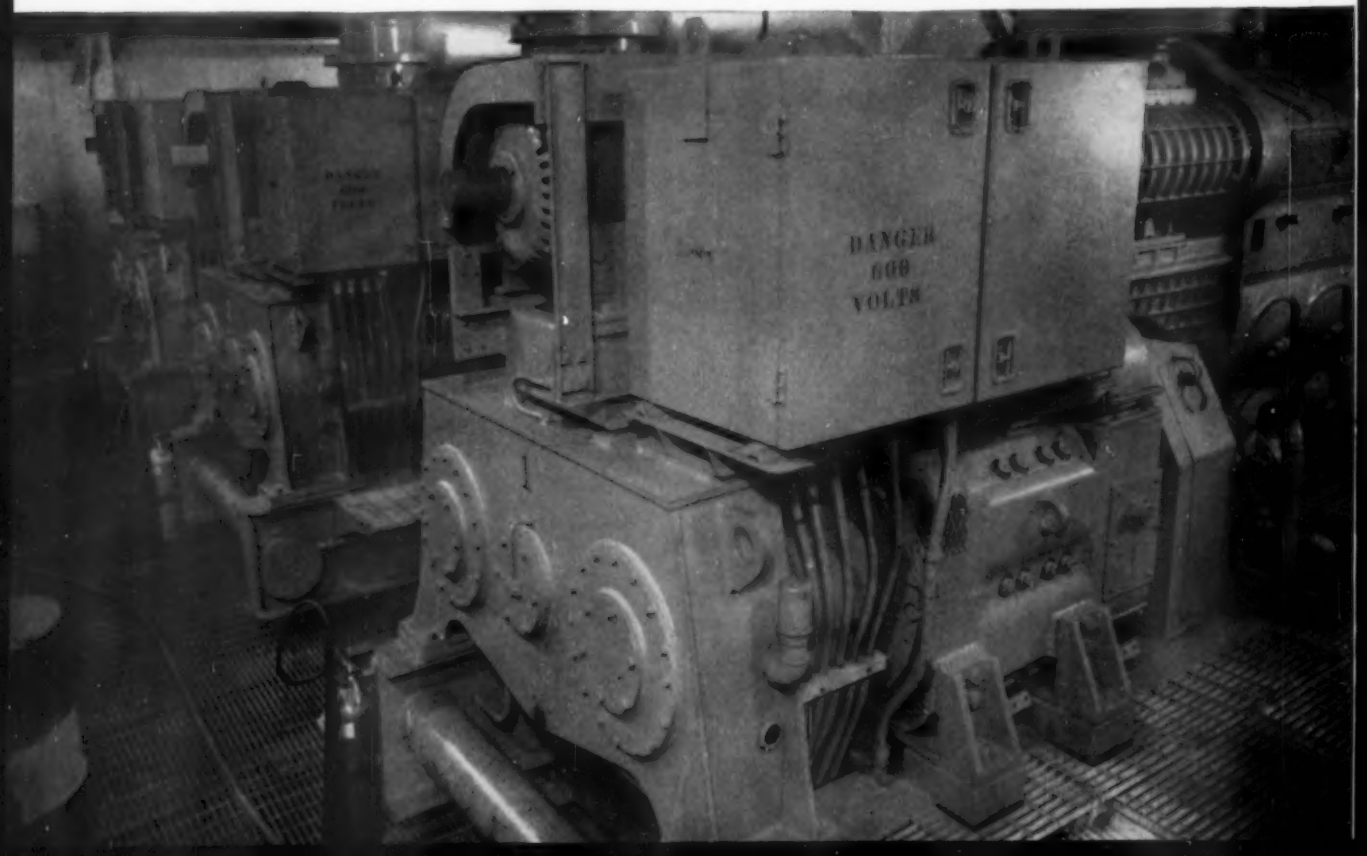
For 100 page Multi-V Drive Manual on sheave and Worthington-Goodyear Green Seal V-belt selection write to Worthington Corporation, Section 79-11, Harrison, N. J.

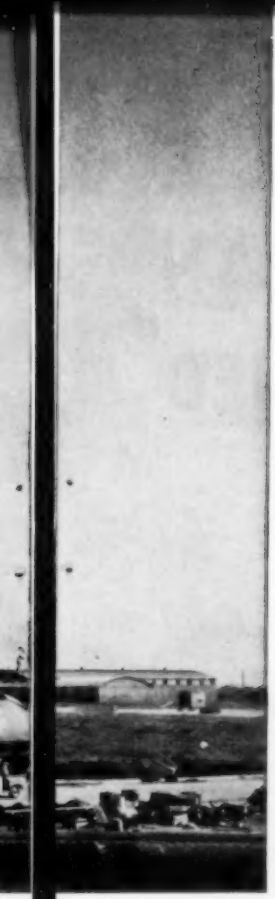
WORTHINGTON



The huge mast on Trans-Gulf's new mobile rig towers 143 feet above the deck. Hydraulically operated legs, each 210 feet long, permit drilling in 75 feet of water. A two-story crew quarters is located on the bow main deck.

Three Electro-Motive engine generator sets of 1000-hp are located in the hull which leaves the deck clear of power equipment. Mud pumps, each powered by two 625-hp electric drive motors are also located below deck.





TRANS-GULF RIG No. 10 is Electro-Motive Powered

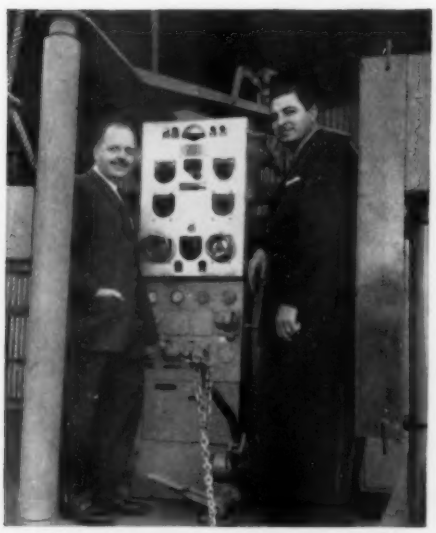
Trans-Gulf No. 10 ranks among the largest rigs in drilling capacity—25,000 feet. Yet, by offshore measurements it is very compact, a design that was accomplished by placing major power equipment in the hull. High cost deck space was held to a minimum without sacrifice of drilling efficiency or accommodations for the crew of forty-two. Deck measures only 87 by 185 feet.

In both control and design, Electro-Motive Power provided cost-saving answers for Trans-Gulf. The standardized components of this power system give complete freedom of equipment arrangement. Standardization also means simplified engineering. You have only *one* manufacturing responsibility for *both* electrical and mechanical components on installation and for service.

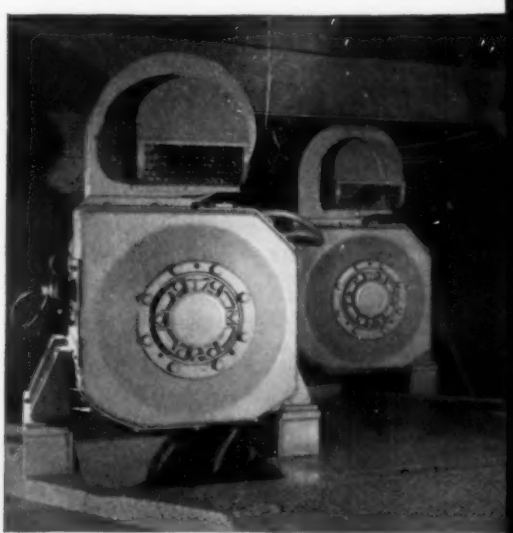
ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS • *In Canada:* General Motors Diesel Limited, London, Ontario

Petroleum industry sales offices: Dallas, Houston, Texas; New Orleans, Louisiana; Los Angeles, California



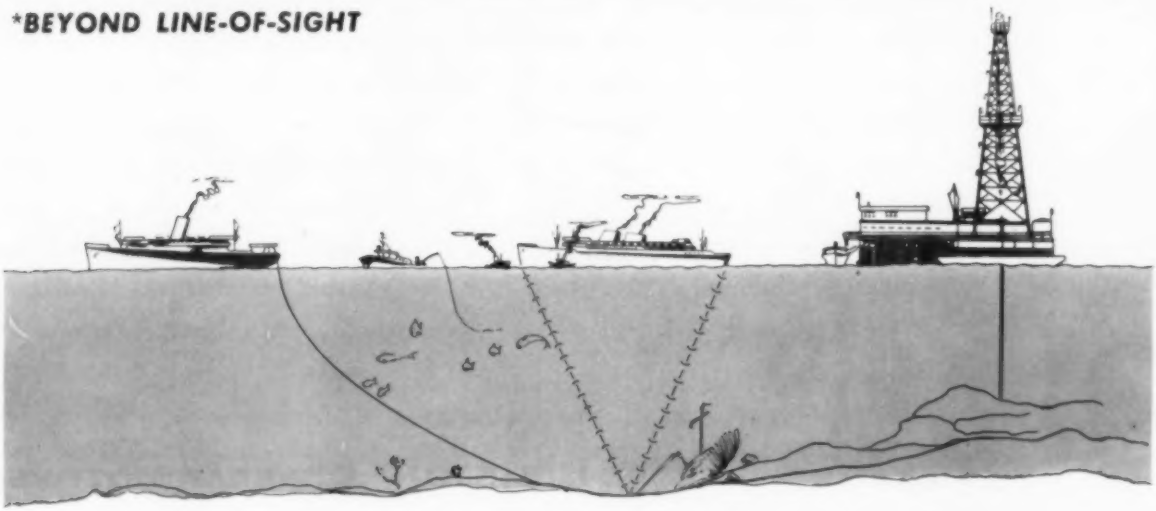
Inspecting the control console at the driller's station is William Flynn, (right), Vice President of Trans-Gulf. With him is Electro-Motive representative Art Hazell.



Two of the three 625-hp electric drive motors for the big 2500-hp IDECO draw works are shown in their mountings underneath the hoist. This unique arrangement conserves valuable deck space.

LORAC HAS LOCATED MORE SURVEYING POINTS* THAN ALL OTHER SYSTEMS COMBINED

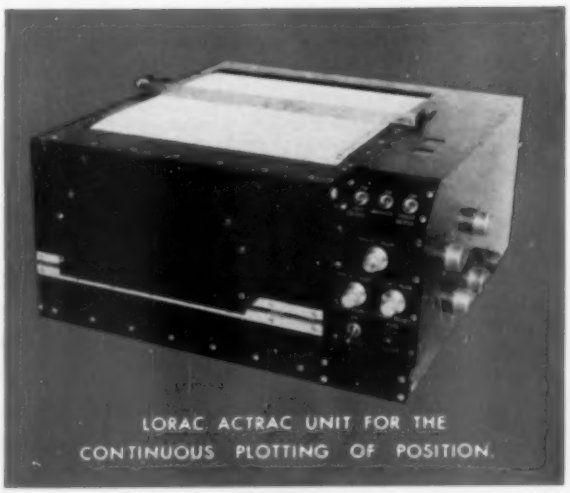
***BEYOND LINE-OF-SIGHT**



To date Lorac has positioned 1,750,000 geophysical stations in the Gulf of Mexico.

For several years Lorac has been standard equipment on the survey ships of the Hydrographic Office of the United States Navy.

Lorac networks serve the precise positioning requirements of the missile test center at Cape Canaveral, Florida.



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Cherifienne des Petroles refinery at Sidi-Kacem, one-time Petitjean. . .

Dr. Maurice Moyal
Petroleum Consultant
Marseilles, France

Shale oil has problems, too

Dear Sir:

Relative to the editorial on page 97 in your May 19 issue ("Shale Oil Taxes Pose a Problem for Crude"), may I suggest that you give the following some consideration with reference to the depletion allowance on the production of shale oil:

The substance from which shale oil is produced is known as kerogen and makes up a comparatively small part of the rock which has to be mined to obtain the oil. In other words, anyone producing shale oil will have to mine a tremendous amount, perhaps 80%, of valueless rock to be able to produce the oil.

This alone is deserving of a 27½% depletion allowance. To produce natural crude oil requires only a relatively small hole to tap the pool of oil. Maybe an allowance should be made to anyone producing shale oil of so much per ton of spent shale produced.

You will very soon receive from Denver Research Institute an economic report on its investigation of our process for retorting oil shale, and this report will show that we can produce by our method shale oil competitively with imported oil.

H. E. Linden
President
Oil Shale Corp.
Beverly Hills, Calif.

No skeletons in this closet

"I do not want to leave any impression that there is any need or desire for immunity from investigation in the pipeline industry. We recognize that congressional investigation to find out how industry and others are conducting themselves in our complex society is an important function of our representative form of government. But there should be some concrete evidence of constructive purpose to be served before time-consuming and expensive investigations are launched.

"As far as our company is concerned, we would much rather spend our time and efforts on something that will produce constructive results for the company and the industry, but we are ready to lay the facts out in any proper investigation without any fear whatsoever.

"While I can speak from actual knowledge only for our company, I am sure that in general the industry has nothing to conceal or fear in any objective investigation.

"In fact, if we can get that kind of investigation, it might be well to make it thorough and complete and get it over with. There have been so many misrepresentations of pipelines that an unbiased investigation could serve to bring out the true story of the distinct service the pipelines are rendering to the public, and to put many unfounded accusations to rest."

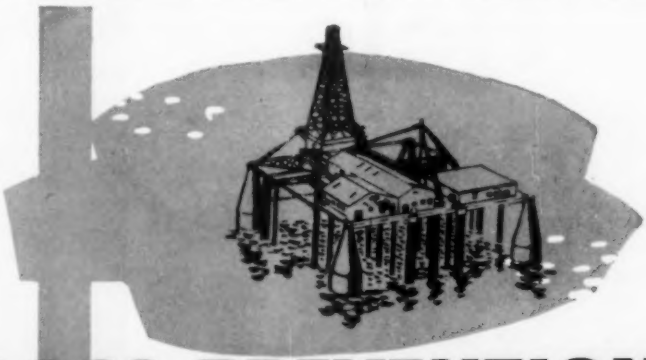
J. L. Burke, president, Service Pipe Line Co., in a speech to the Tulsa Pipe Liners Club.

As Carson sees his job

"The interest of the federal Government in oil is motivated by considerations of national security, and one aspect of this interest can be seen in the voluntary oil import program.

"As administrator of the program, it is my job, following the policies approved by the President, to limit crude-oil imports in the interests of national security.

"My efforts are not, should not, and cannot be devoted to protection of the markets and profits of any individual. Nor can this be the function of the federal Government in this



LOSS PREVENTION

—included in your offshore oil insurance

YOUR INSURANCE AGENT knows the importance of experienced handling in arranging proper coverage, and he knows how much the proper servicing of losses can mean to you. For this reason he will probably recommend placing the insurance on your offshore oil drilling and production equipment with a specialized market such as Southern Marine.

Southern Marine's Loss Prevention Service, included at no extra cost, is geared to work with you in preventing loss in order to reduce future insurance costs and prevent equipment down-time. Even with full reimbursement for loss or damage, equipment down-time knocks out your income. Ask those who use Southern Marine Loss Prevention Service how well it works.

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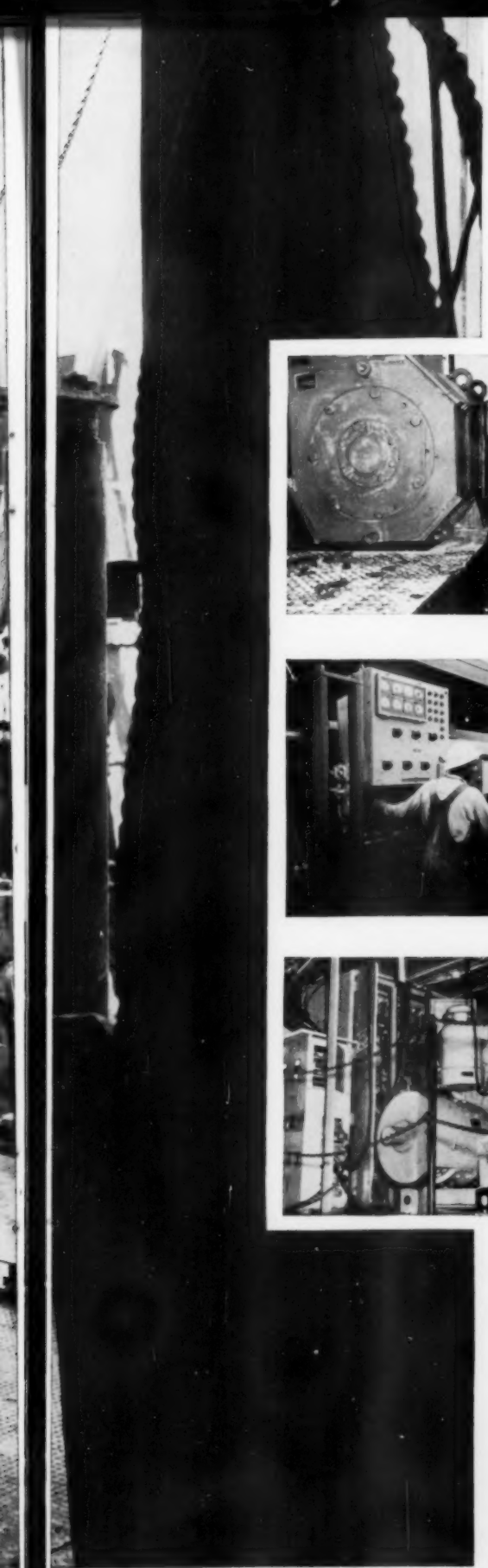
Drill More Hole At Less Cost!

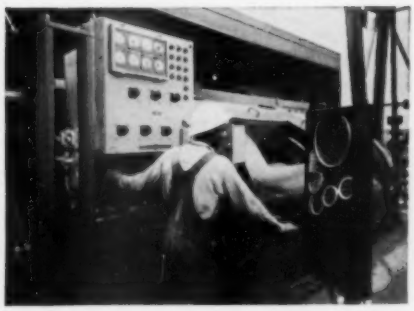
For New or Repowered Rigs . . . General Electric Drive Systems Offer Savings That Other Electric or Mechanical Equipments Just Don't Duplicate



HERE'S HOW G-E ELECTRIC DRIVE REDUCES DRILLING COSTS ON NEW OR REPOWERED RIGS

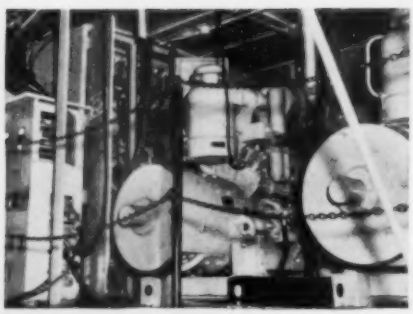
1. G-E DRILLING MOTORS HAVE BUILT-IN PROTECTION—REQUIRE LITTLE MAINTENANCE.

Because of drilling characteristics inherent in the G-E system, GE752H drilling motors need no special external control and will not run away in case of load loss. This helps to eliminate drill stem twist-offs and mud-pump overspeeding. Because of its sturdy construction, the GE752H motor requires little maintenance, gives added years of service.



2. G-E DRIVE GIVES YOU POSITIVE DRILLING CONTROL.

G-E Drive control is simple to operate and easy to understand. The driller's console may be floor-mounted or drawworks-mounted, to suit your requirements. Familiar, proven, air-operated devices give you positive control over all drilling functions, which enables you to drill more hole. And with G-E Drive, the main control compartment may be located away from the drilling area. It requires no attention during normal drilling operations.



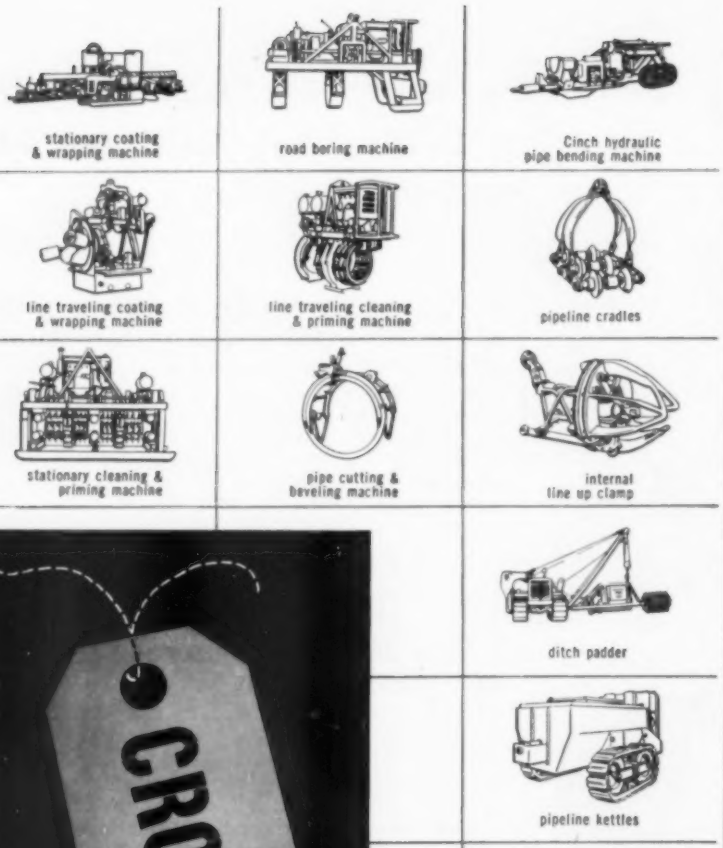
3. GENERATORS CAN BE USED WITH THE OIL-FIELD ENGINE YOU LIKE BEST.

When you use General Electric Drive, you can continue using the engine you know best because G-E generators are designed to operate with virtually all makes of oil-field engines. You need not spend money training personnel in the operation and maintenance of different engines. G-E generators will not overload engines and, outside of routine inspection, they require service only during major overhauls.

FOR MORE INFORMATION ABOUT GENERAL ELECTRIC DRIVE, call your nearest G-E Apparatus Sales Office. Drilling offices are located in Dallas, Denver, Houston, Los Angeles, New Orleans, and Tulsa; in Canada: Calgary and Toronto. For overseas requirements, International General Electric drilling offices are located in Bogota, Buenos Aires, Caracas, Maracaibo, Mexico City, New York, and Puerto LaCruz. General Electric Company, Locomotive and Car Equipment Dept., Erie, Pa. 115-28

Progress Is Our Most Important Product

GENERAL ELECTRIC



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highly complex field of crude oil imports. And, I doubt if many oil men, who proudly wear the title of independent, really would want it that way."

Capt. Matthew V. Carson, Jr., administrator, voluntary oil import program, in a speech to the Rocky Mountain Oil and Gas Association, Denver.

CALENDAR

JUNE

10-12 Appalachian Underground Corrosion Short Course, School of Mines, West Virginia University, Morgantown, W. Va.

11-12 Independent Oil Producers and Land Owners Association, Tri-State; Independent Petroleum Association of America (Illinois, Indiana, Kentucky); annual meeting, Green Hills Country Club, Mount Vernon, Ill.

11-14 National Society of Professional Engineers, annual meeting, Chase & Park Plaza Hotels, St. Louis.

15-19 American Society of Mechanical Engineers, semiannual meeting, Hotel Statler, Detroit.

19 Pennsylvania Grade Crude Oil Association, annual meeting, Penhills Club, Bradford, Pa.

20 Southern Gas Association, transmission section, dispatchers' roundtable conference, Noel Hotel, Nashville, Tenn.

18-28 British Chemical Plant Manufacturers' Association, Council of British Manufacturers of Petroleum Equipment, chemical and petroleum engineering exhibition, London.

22-27 American Society for Testing Materials, annual meeting and exhibit, Hotels Statler and Sheraton-Plaza, Boston.

23-25 Interstate Oil Compact Commission, midyear meeting, Hotel Utah, Salt Lake City.

24-27 Canadian Gas Association, fifty-first annual meeting, Manoir Richelieu, Quebec.

25-26 Western Petroleum Refiners Association, Mid-Continent regional technical-industrial relations meeting, Broadview Hotel, Wichita.

28-July 2 Petroleum Equipment Suppliers Association, twenty-third annual meeting, Chateau Frontenac, Quebec.

JULY

23-26 Wyoming Geological Society, thirteenth annual field conference, Powder River basin.

AUGUST

11-14 Society of Automotive Engineers, National West Coast meeting, The Ambassador, Los Angeles.

19-22 American Institute of Electrical Engineers, general meeting, Sacramento.

25-27 Appalachian Gas Measurement Short Course, University of West Virginia, Morgantown, W. Va.

SEPTEMBER

7-12 American Chemical Society, fall meeting, Chicago.

10-12 National Petroleum Association, fifty-sixth annual meeting, Traymore Hotel, Atlantic City, N. J.

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1. Seamless and weldless construction.
2. Made from new, full weight material.
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LARKIN LEADERSHIP HAS BEEN EARNED BY YEARS OF DEPENDABLE PERFORMANCE

10-13 Intermountain Association of Petroleum Geologists, ninth annual field conference, Paradox basin.

15-16 Independent Natural Gas Association of America, annual membership meeting, Roosevelt Hotel, New Orleans.

15-17 American Institute of Electrical Engineers, conference on petroleum, Baker Hotel, Dallas.

18 Natural Gasoline Association of America, Rocky Mountain regional meeting, Gladstone Hotel, Casper, Wyo.

21-24 American Society of Mechanical Engineers, petroleum division, mechanical engineering conference, Cosmopolitan Hotel, Denver.

24-25 Western Petroleum Refiners Association, Rocky Mountain regional technical-industrial relations meeting, Henning Hotel, Casper, Wyo.

25-26 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.

29-Oct. 3 Society of Automotive Engineers, national aeronautic meeting, aeronautic production forum, and aircraft engineering display, The Ambassador, Los Angeles.

OCTOBER

1-2 Western Petroleum Refiners Association, third annual stream-pollution and waste-disposal conference, Lassen Hotel, Wichita.

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OFFSHORE OR INSHORE, in the industry's largest or smallest operations, the Whitney is prepared to offer financial assistance and counsel in exploration, drilling, refining and marketing of petroleum products.

Whitney

NATIONAL BANK OF NEW ORLEANS

Established 1883 Member F. D. I. C.

1853 WHITNEY 75th YEAR 1928

1-3 American Association of Oilwell Drilling Contractors, eighteenth annual meeting, Adolphus and Baker Hotels, Dallas.

5-8 Society of Petroleum Engineers of AIME, fall meeting, Houston.

5-8 National Association of Corrosion Engineers, northeast region, Somerset Hotel, Boston.

7-8 Texas Mid-Continent Oil and Gas Association, annual meeting, Statler-Hilton Hotel, Dallas.

12-18 OIL PROGRESS WEEK.

13-15 American Gas Association, annual convention, Atlantic City, N. J.

13-15 American Society of Mechanical Engineers, American Society of Lubricating Engineers, conference on lubrication, Statler Hotel, Los Angeles.

13-16 Society of Exploration Geophysicists, annual meeting, Hotel Gunter, San Antonio, Tex.

13-17 American Society of Civil Engineers, annual convention, Hotel Statler, New York.

15-16 South Dakota Independent Oil Men's Association, convention, Sheraton-Johnson Hotel, Rapid City.

15-17 National Association of Corrosion Engineers, north central region, Cincinnati.

16-17 Society of Petroleum Engineers of AIME, Southern California petroleum section, Biltmore Hotel, Los Angeles.

19-21 National Association of Oil Equipment Jobbers, annual convention and trade show, Hotel Adolphus, Dallas.

20-24 National Association of Corrosion Engineers, south central region, Roosevelt Hotel, New Orleans.

22-23 National Association of Corrosion Engineers, western region, corrosion control course, U. S. Grant Hotel, San Diego, Calif.

22-24 Southwestern Federation of Geological Societies, technical meeting, Mineral Wells, Tex.

22-24 Society of Automotive Engineers, national diesel engine meeting, Lord Baltimore Hotel, Baltimore.

23-24 Western Petroleum Refiners Association, refining technology and industrial relations meeting, Rufus Garrett Hotel, El Dorado, Ark.

27-28 Independent Petroleum Association of America, annual meeting, Statler-Hilton Hotel, Dallas.

26-31 American Institute of Electrical Engineers, general meeting, Pittsburgh.

NOVEMBER

5- 6 Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.

6- 7 American Association of Petroleum Geologists, Pacific section annual meeting, Los Angeles.

10 Transportation Club of the Petroleum Industry, annual meeting, Bismarck Hotel, Chicago.

10-13 American Petroleum Institute, thirty-eighth annual meeting, Conrad Hilton, Palmer House, and Congress hotels, Chicago.

18-20 Ninth National Conference on Standards, Hotel Roosevelt, New York.

21 Natural Gasoline Association of America, Panhandle Plains regional meeting, Herring Hotel, Amarillo.

30-Dec. 5 American Society of Mechanical Engineers, annual meeting, Statler and Sheraton-McAlpin hotels, New York.

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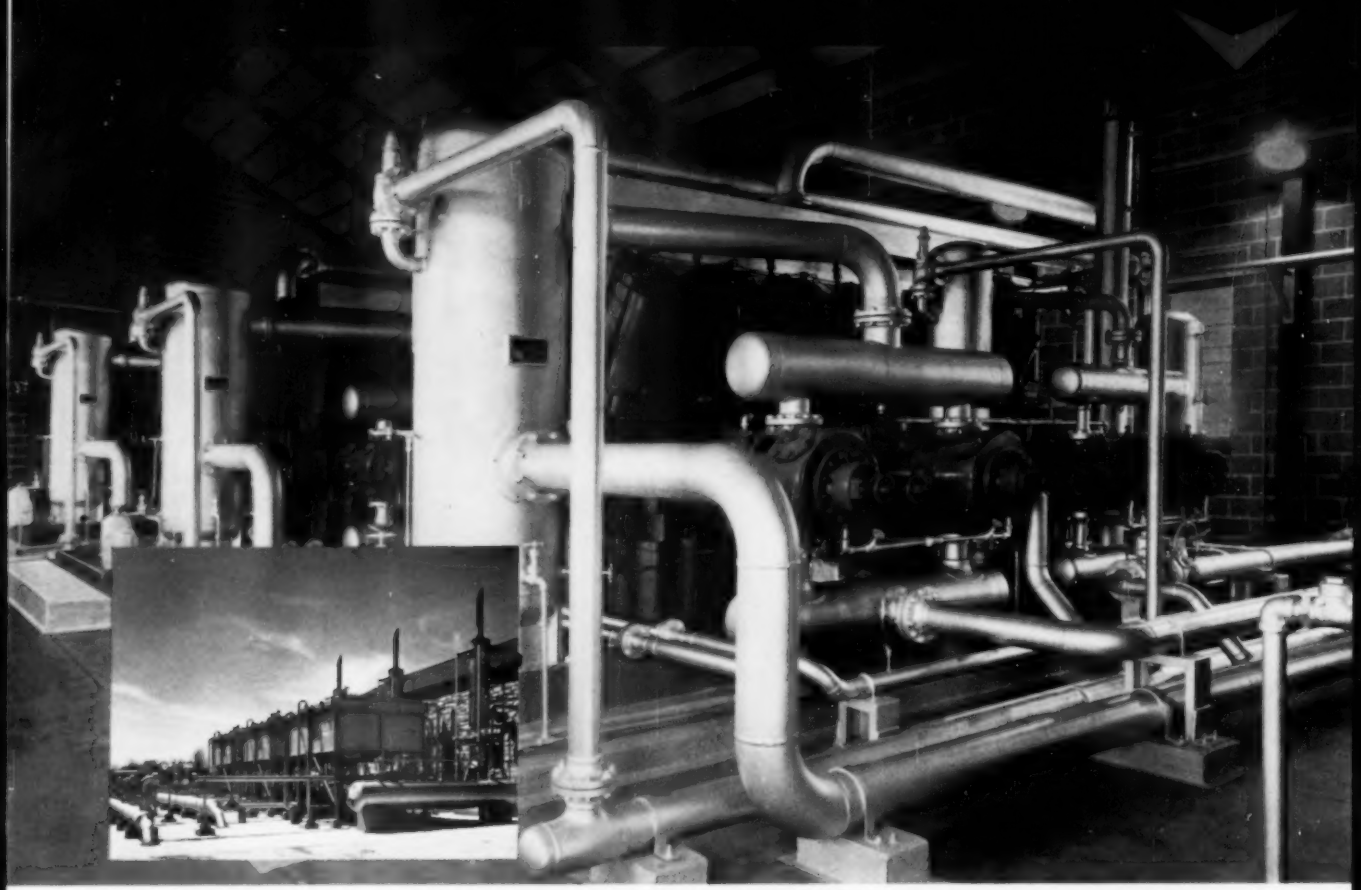

Horizontal radiators are cooled by hydraulic motor driven fans powered by pumps V-belted to sheaves on the end of each engine crankshaft.

Laclede Gas Company's Gas Storage Project—equipped with three Beaird-Ingersoll-Rand 660 h.p. 12SVG packaged compressors. Units have Young radiators with gas, lubricating oil and engine water cooling sections. Other Beaird compressors from 120 to 660 h.p.

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JOURNALLY SPEAKING

Good-Bye Andy

A PART of the oil industry died with Andy Rowley.

Andy was not just an oil writer who stuck to his beat for nearly 40 years. To a whole generation of oil men in the Southwest, Andy was their best friend and severest critic.

He was a reformer at heart. He spoke his mind on every subject. He preached, cajoled, criticized, defended—and let the chips fall where they might.

Andy was a newspaperman's newspaperman—convivial, boisterous, generous, quick-tempered, outspoken. If he didn't like what an oil operator did, he said so, and minced no words. Yet he would work his shirt off to help a friend, whether a big oil man or another reporter. And these did the same for him.

Once a reporter for a newspaper in an area where oil had just been discovered wrote to several oil writers in the Southwest asking advice on how to cover this strange new industry with its unintelligible lingo. Andy had never heard of the fellow before, but he spent a whole day writing him page after page of instructions and advice.

That was typical of Andy Rowley. He did it partly out of sympathy for a bewildered fellow journalist, partly as a service to the industry he loved. He wanted to see newspapers present oil in its proper light.

Andy took it on himself to be a one-man public-relations counsel for the entire industry. He rose to defend the industry every time it was attacked. Time after time his typewriter spewed out columns of vitriol against any politician or writer who made untrue statements or unwarranted conclusions about oil or oil men. But he was just as critical of oil men themselves when they did something he disliked or failed to defend themselves from attack.

But he wasn't a destructive critic. He was just as free at volunteering his advice for improving any situation. His ideas were always interesting, frequently cogent, and occasionally adopted.

One of the jobs of which he was most proud was being midwife to the Interstate Oil Compact. Andy was reporting a conference of oil-state governors during the dark days of the depression when the oil industry faced either chaos or federal control. Despite long negotiations the conference was breaking up in disagreement. Andy was determined that that wouldn't happen. Abandoning his role as a reporter, Andy talked turkey to the individual governors and their representatives, bludgeoned them into making another try, and then sat down to his portable typewriter and pounded out the basis of an agreement which met general approval and finally grew into the official Compact.

He had done much the same thing back in the early 1920's when he was a reporter on a Pittsburgh newspaper with a side job doing publicity for the natural-gas industry. The federal Government was campaigning for conservation laws and Andy was working with a committee trying, without much success, to get state legislation. When the committee fell apart, Andy took on the job and wrote the outline of a law which won acceptance in several states.

Shortly after that Andy came to Tulsa and joined The Oil and Gas Journal staff in 1922. If the Journal's late publisher, Patrick C. Boyle, had been alive then, both he and Andy might have had some doubts about this connection. For a few years earlier Andy had told Pat Boyle to go to hell, just like that.

It was when Andy was with the Associated Press in Pittsburgh and his job was to file copy for papers in western Pennsylvania, including Boyle's Oil City Derrick. A terrific storm tore down telegraph wires and almost everything else in that part of the state, but Andy managed to get a few thousand words to his papers. Dog tired, he was about to get some rest when Boyle telephoned him (via Buffalo and New York City) demanding more coverage on the storm. Though Boyle was a director of the AP, Andy told him where he could go. Boyle didn't go, and Andy wasn't fired.

After 14 years with the Journal, Andy became oil editor of the Tulsa Tribune in 1937. There for nearly 21 years he continued his crusade for the oil industry, calling the shots as he saw them.

We'll all miss Andy, oil men and oil writers alike.

—Henry D. Ralph

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Political perversion of the antitrust law

THE indictment of 29 major oil companies for raising the price of crude oil and gasoline in January 1957 is the most purely political persecution in the Government's long campaign to keep the oil industry in public disrepute.

Whatever bits of seeming evidence of collusion the Department of Justice may have dug up in its 18 months' investigation, the charges of conspiracy must remain tenuous and ridiculous to anyone with more than a superficial knowledge of the way oil prices are made.

The indictment is another example of the Government's obsession with two shibboleths: that more-or-less uniform pricing of a uniform commodity in a competitive industry is the result of conspiracy; and that the oil industry is inherently evil.

CONSIDER THE CIRCUMSTANCES of the price increase. The Government asked the big oil companies to buy all oil they could to supply Europe while the Suez Canal was closed. They bid against each other until all available stocks were gone.

Then one big exporter raised its bid for crude to fill its European commitments. Other buyers were caught by surprise, but they soon had to raise their offers in order to get crude from independent producers. They were forced into it by competition.

For a couple of weeks there was great uncertainty. Different buyers raised different amounts in different areas. Some early raises were cut back a few days later when competitors did not follow.

To anyone familiar with the conditions at the time it was evident that the price was being set by confusion rather than collusion.

The price of gasoline went up proportionately because refiners' margins are narrow and their prices must reflect the cost of raw material.

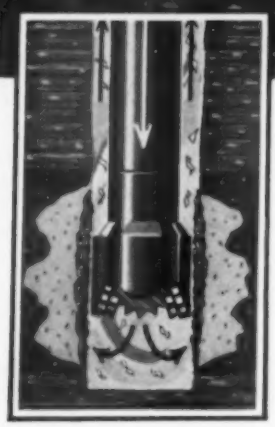
Both European and domestic consumers complained about the price increases, and Congress began an investigation. That was an expected political move by a political body, and caused no lasting harm. The industry explained its position and was largely vindicated.

BUT FOR POLITICAL reasons the Department of Justice got into the act with an antitrust investigation. This was purely and simply to harass the industry and as a sop to its critics in Congress.

The delayed indictment is preposterous and unrealistic. The companies have an excellent defense, and should have no trouble convincing a trial jury of their innocence of conspiracy.

But meanwhile the entire oil industry is done incalculable harm. In the eyes of the public, particularly in foreign countries, it is branded by its Government as monopolistic and price-gouging.

It is a perversion of the antitrust law to use it for political persecution, as this so patently is.



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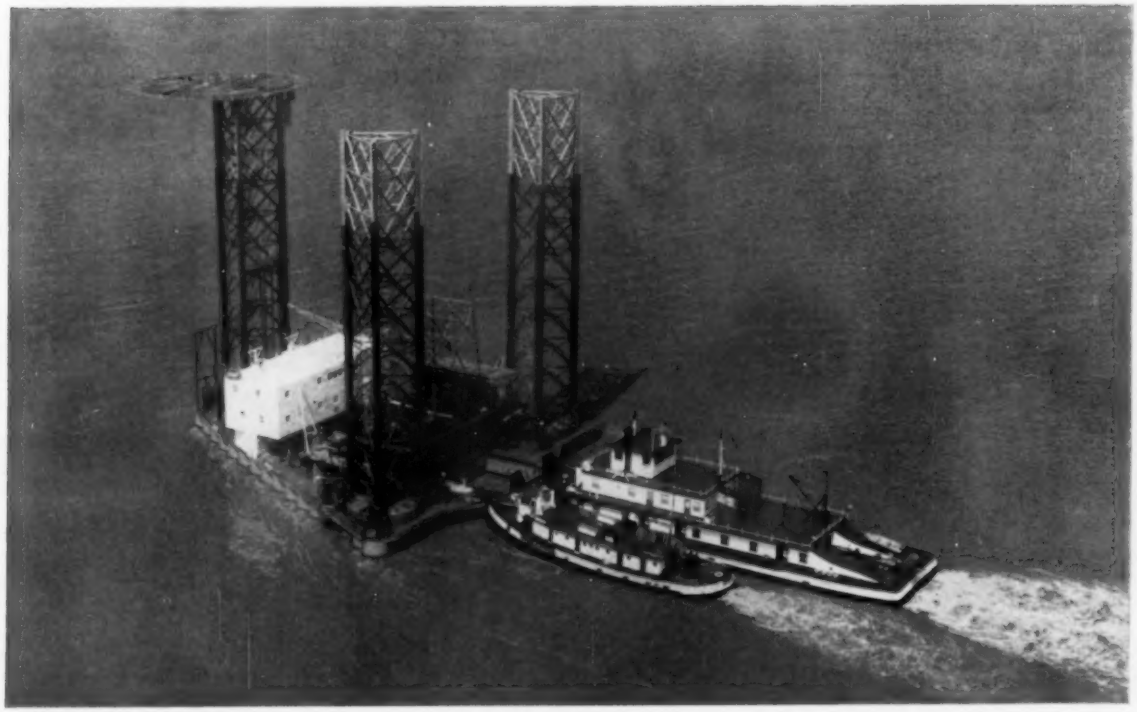


MORE drilling rigs head seaward off Louisiana and Texas, now that . . .

Contractors Go Farmout Route in Gulf

• The majors are drilling few offshore wells, but contractors are creating their own business to stave off bankruptcy. It's a big risk, but the rewards can be huge for small operators. And some already have succeeded.

Joe Reilly
Houston District Editor

THE CURRENT drilling slump in the Gulf of Mexico has presented an unexpected opportunity for offshore drilling contractors.

Although it seems like a paradox, the prospects for bankruptcy-threatened contractors are in some ways better than during the big offshore boom a year or two ago.

Then, practically every contractor working in the Gulf of Mexico had a waiting list of clients. There weren't enough rigs to go around. Some barges and mobile platforms had a year's work lined up before they set out to sea. But this rosy situation changed suddenly and drastically. As major operators reduced their offshore drilling, new rigs continued to join the fleet. Few of them were paid for.

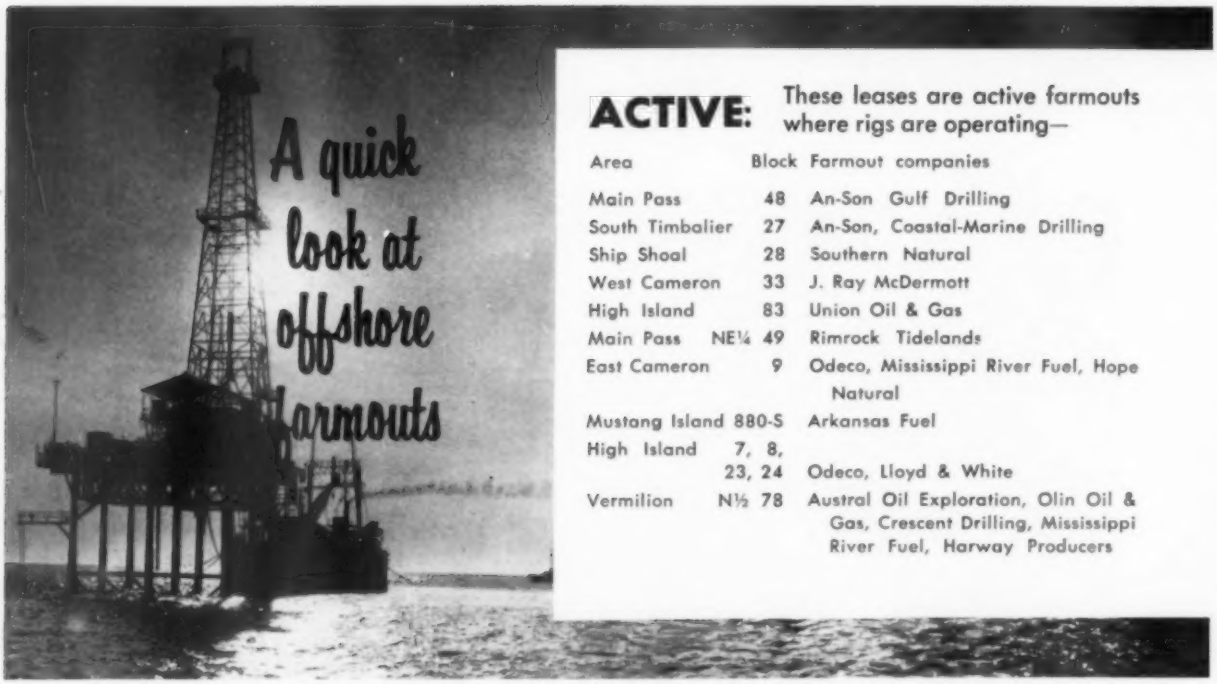
Today, approximately two-thirds of the offshore rigs are idle. Even some of the favored few that are working do not earn enough for expenses.

Some aggressive contractors are taking advantage of the current offshore gloom by putting rigs to work on their own farmouts. Those who hit may emerge from the slump stronger than ever before. As oil and gas producers they will not be wholly dependent on the erratic drilling business.

Failure to select the right farmouts may be fatal to a little company, but many consider the risk worth taking. They're doomed to almost certain bankruptcy as contractors, anyway, unless the drilling business picks up sharply. They figure a dry hole or two of their own would merely hasten the process.

If the offshore hadn't lost a lot of its luster the little fellow never would have had today's opportunity to obtain farmouts.

The big companies didn't pay up to $7,000,000 for a 5,000-acre offshore lease to let somebody else drill it. But the economic situation in the oil industry has changed since such offers were made 3 years ago. Increased costs on the one hand and reduced production allowables on the other have combined to make some of



ACTIVE: These leases are active farmouts where rigs are operating—

Area	Block	Farmout companies
Main Pass	48	An-Son Gulf Drilling
South Timbalier	27	An-Son, Coastal-Marine Drilling
Ship Shoal	28	Southern Natural
West Cameron	33	J. Ray McDermott
High Island	83	Union Oil & Gas
Main Pass NE¼	49	Rimrock Tidelands
East Cameron	9	Odeco, Mississippi River Fuel, Hope Natural
Mustang Island	880-S	Arkansas Fuel
High Island	7, 8, 23, 24	Odeco, Lloyd & White
Vermilion	N½ 78	Austral Oil Exploration, Olin Oil & Gas, Crescent Drilling, Mississippi River Fuel, Harway Producers

the bonuses paid for offshore leases look pretty unrealistic today.

Odds better today . . . Historically, independents have made money where major companies couldn't afford to operate. The majors are always looking for the Spindletops, the East Texas fields, and the Pembinas. They don't find them very often, and they probably haven't found anything of such proportions in the Gulf of Mexico.

But they have left untouched some promising structures which could make a few independents prosper.

In recent weeks, as untouched leases neared expiration, the majors have been farming out acreage that looked mighty promising a few years ago. Some of the leases are still available, and more will be offered as their expiration dates approach. According to federal and state records, leases covering more than 30,000 acres are scheduled to expire by the end of this year unless drilling starts by that date.

Half interest in leases covering 5,000 acres may be acquired today for the drilling of one well. Under favorable circumstances, the test can be sunk for about $200,000 or $300,000. Since the original lease may have cost several million dollars, plus annual rental for 3 or 4 years, the price for a half interest today is in some cases one-tenth what it was in 1955.

Not the best . . . Cheap farmouts are not necessarily desirable. Independents hesitate to drill where the majors have shied away.

As one offshore drilling contractor explains it, an ideal farmout is like what the old Negro described as a "perfect" bottle of whisky which had just been presented to him. "If it was any worse," the grateful Negro explained, "I wouldn't drink it, and, if it was any better, you wouldn't give it to me."

The majors, naturally, are still retaining what they consider their most favorable prospects. So far, they've looked good in selecting acreage to hold. Most of the discoveries that have been made on farmouts have been gas wells that are still shut in awaiting a market.

Although the majors may have left no Spindletops on idle acreage, they have left some strat traps untested which may eventually prove embarrassing. If onshore conditions are any norm for judging offshore prospects, some of these unexplored strat traps are likely to produce 25,000,000 bbl. or more of oil. That's the kind of oil on which independents thrive.

By taking a partner or two, a small drilling contractor can have a look at the most promising sands on a 5,000-acre lease for perhaps as little as $100,000.

Although it's only a fraction of what the major may have already spent for the acreage, it's still a big sum for a small contractor on the brink of bankruptcy. But the sum doesn't seem so big when you consider that the contractor already has $3,000,000 or so invested in a drilling rig that's costing him big money every day it sits idle.

For a small fraction of his present investment he can gamble on stakes much bigger than anything he's been able to compete for in the past.

The bloom's off . . . There has been little change in the basic economics of offshore operations during the past 4 or 5 years. But the recent doldrums of the oil industry in general caused the majors to lose what one independent calls their "hunger for reserves."

There are few majors making money offshore today. Their production, for the most part, is close to shore and in fairly shallow water.

Today's low production allowables do not encourage continued exploration on the expensive, deepwater locations. But if these locations are to be drilled at all, it's usually up to the major to do it. For they're even less lucrative to the small fellow than they are to the major.

As a result, the big companies are straining their offshore budgets in exploring the more promising distant areas and in developing production that offers a reasonable payout.

This has left some fairly good prospects close to shore for the independents. Some of them are on state leases which cost the operator half of the original bonus each year in rental. When the rental's about to come due there's a sudden urge to farm out the acreage to somebody who can get a rig on it in a hurry.

Even some of the majors will admit they were too optimistic in bidding for offshore acreage a few years ago. With

SUCCESSES: These farmouts* have discoveries or extensions—

Area	Block	Farmout companies
Vermilion	86	Zapata, Felmont
Ship Shoal	28	Southern Natural
West Cameron	33	J. Ray McDermott
High Island	83	Union Oil & Gas
East Cameron	9	Odeco, Mississippi River Fuel, Hope Natural
Eugene Island	27	Odeco
Eugene Island	94	Odeco, Edwin W. Pauley
Main Pass	45	Odeco, North Central Oil, Delta Marine Drilling

*Blocks in this column which are also in the column to the left are active farmouts which previously have found production.

EXPIRING: These leases expire this year unless drilling starts—

Area	Block	Acreage	Lessee
Eugene Island	S½ 19	2,500	Pure
Eugene Island	E½ 93	2,500	Phillips
Eugene Island	SE¼ 90	1,250	Phillips
Eugene Island	NE¼ 112	1,250	Phillips
East Cameron	75	5,000	Phillips
South Pelto	SE¼ 23	1,250	Superior et al
S. Timbalier	20	*2,300	Phillips et al
Vermilion	S½ 40	2,097	Anderson-Prichard
Ship Shoal	34	5,000	Kerr-McGee et al
Ship Shoal	36	5,000	Kerr-McGee et al
West Cameron	S½ 56	2,500	Superior

*Portion claimed by U. S. Government

the added costs of operating offshore, high bonus payments added tremendously to the economic disadvantage of oil found in the submerged lands.

Others caught, too . . . The offshore romance affected not only the oil companies, but the Wall Street brokers, the shipbuilders, and the speculators who were looking for a glamorous place to put their money. As a result, there were far more offshore rigs built than were needed for orderly development of all present leases.

Some contractors hope for another federal lease sale to brighten their prospects. But such a sale is not likely in the near future.

Even if half the present offshore contractors went broke there would still be little hope of early prosperity for the remainder. As the rigs changed hands they would remain in competition for the few contracts available.

In some cases, contract rates already are far below the break-even point. One contractor points out that a big offshore rig could command $9,000 a day in 1954. A comparable rig recently went to work for about $5,000 a day, with part of the payment to be on a footage basis.

"We're not trying to make any money as a drilling contractor," says an official of one of the most successful offshore drilling firms. His company, like several others which started out strictly as drilling contractors, is now investing much of its drilling revenue in farmouts, hoping to get in the production business.

Odeco's record . . . One of the most aggressive in looking for farmouts is Ocean Drilling & Exploration Co., New Orleans. Odeco has earned a working interest in at least a half dozen offshore leases and is on the lookout for more.

The company has no offshore production, but it has made several discoveries on farmouts. Its most promising is on a 2,500-acre lease in East Cameron Block 9. Odeco, Mississippi River Fuel Corp., and Hope Natural Gas Co. have 29.166% working interest each in this lease, which was farmed out by Magnolia Petroleum.

One of Odeco's drilling barges, the "John Hayward," has been doing development drilling there since completion of the discovery about a year ago. Proved reserves in the field are estimated at about 4,000,000 bbl. of condensate and 200 billion cubic feet of gas. The operators hope to have a market for the production about the end of this year.

Odeco also has a 50% working interest in Blocks 27 and 94, Eugene Island area, and has completed gas wells on each block. Remainder of the working interest in Block 27 is held by The Texas Co. Edwin W. Pauley has 50% working interest in Block 94.

In Block 45, Main Pass area, Odeco earned an interest in a 2,500-acre farmout from The California Co. Its partners in this venture include North Central Oil Co. and Delta Marine Drilling Co.

The first well on this acreage was completed as a dual oil and gas discovery. It produced oil for a few days but was shut in because of water encroachment. The gas zone had a calculated open-flow potential of 4,100,000 cu. ft. per day. A second well was abandoned as a dry hole. Further development is planned.

Not all of Odeco's farmouts have been productive, or even encouraging. It drilled a dry hole in West Cameron Block 66 and another in Lake Fortuna, where a second well has been started.

Others in the game . . . Zapata Off-Shore Co. has hit on one out of two farmouts from the CATC Group.

Zapata, together with Felmont Oil Co., earned half interest in a 5,000-acre lease in Vermilion Block 86, where they have a shutin gas discovery.

In Vermilion Block 96, also a CATC farmout, Zapata drilled a dry hole. Its partners in this venture reportedly included H. C. Price, Bartlesville, Okla., and a group of New York investors.

J. Ray McDermott, part owner of Offshore Co., has drilled two tight holes on a farmout in Block 33, West Cameron. According to the rumor mill, the first well found about 400 ft. of productive sand, presumably a gas zone. At last report the second well was being tested below 14,500 ft.

Southern Natural Gas Co., also joint owner of Offshore Co., is developing a promising gas field in Block 28, Ship Shoal area. Kerr-McGee Oil Industries, Inc., which is both a con-

tract driller and producer, is a partner in the venture.

Union Oil & Gas Corp. of Louisiana, though not a contractor, has made a dramatic debut in its first major offshore role. The company has a prospective gas discovery on a farmout from Pan American Petroleum Corp. off the High Island area of Texas. The farmout covers about 4,500 acres in State Tracts 83, 84, 85, 94, 95, 96, and 97.

The cost . . . Contractors are confining their own exploration activity mostly to shallow water fairly close to shore. Drilling's cheaper there. And if they hit they have a better chance of producing at a profit.

Much of the contractor's drilling for his own account also is relatively shallow. As one contractor explains it, he can drill a 10,000-ft. hole in 30 ft. of water for roughly $200,000. This will give him a look at perhaps 5,000 ft. of prospective pay.

If he drills on down to 12,000 ft., cost of the well may double. Down to 14,000 ft., the well would cost close to $1,000,000. The way he figures it, he can explore the first 5,000 ft. of prospective pay sands at about $40 a foot. The next 4,000 ft. would cost about $200 a foot.

Who's drilling where . . . Drilling has started or is expected to start within a few days on at least 11 farmouts (see table).

The list does not include the farmouts taken by major companies from each other.

Deepwater Exploration Co. recently drilled a dry hole on a CATC farmout in Block 174, Ship Shoal area. Participants included Anderson-Prichard Oil Corp., Amerada Petroleum Corp., and Lloyd & White, Dallas.

There also are several independents such as Coral Drilling Co., New Orleans, which have participated in farmouts in the past and likely will try again in the future. Then, too, there are newcomers such as Reading & Bates Offshore Drilling Co., of Tulsa and New Orleans, which plan to take farmouts when they find something that appeals to them.

Another boom ahead? . . . Stiff competition in the Gulf of Mexico has driven some offshore rigs to more promising waters.

Zapata, for instance, now has one platform drilling off the Bahamas. Odeco has a rig ready to go to work off the coast of Mexico. Offshore Co. has sent a rig to Panama. And several U. S. firms are working in Lake Maracaibo.

Other offshore rigs have been built specifically for drilling in foreign waters—in the Persian Gulf and the Gulf of Paria, for example.

The transfer of rigs has helped ease the letdown in the Gulf of Mexico. How long the slump will continue will depend on general economic conditions, success of foreign oil ventures, and many other factors.

But it's far too early to count out the thick, lush sands that lie under the Gulf of Mexico. This submerged area still ranks potentially as one of the greatest domestic oil provinces, and it likely will gain in importance as oil becomes harder to find on the mainland.

During the current slump there's lots of brainwork going into the problem of reducing costs in offshore drilling and production. Lower bonuses can be expected in future offshore lease sales, and technological progress is helping to ease the economic disadvantage of offshore production.

When the pendulum swings back in favor of domestic operations, as many think it eventually will do, the offshore area may boom again. The next boom should be more enduring and on a sounder economic basis.

Drilling contractors who get in on successful farmouts are building up reserves which offer the hope of prosperity in future years. In giving the contractors a chance to ease the offshore slump themselves, farmouts also pay immediate dividends.

Every time a contractor goes to work for his own account there's one less rig to compete for the next contract to be let by a major. The contractors who are fortunate enough to hit a decent pool may be out of competition for years. Their rigs will have plenty of work in development drilling, the kind of drilling that pays off.

A Journal Special

"Offshore Report"

FOR MORE stories on offshore drilling in the U. S., see the Journal's special 23-page section, "Offshore Report," starting on page 91.

The section contains articles on cutting offshore drilling costs, operating more cheaply under low allowables, petroleum reserves on the Continental Shelf, record pipeline construction this year, and California's new permanent-type platform for drilling two wells simultaneously.

West Coast Is

SANCTIONED CRUDE imports into the West Coast will be cut sharply next month in a new voluntary program to be annouced possibly this week by the cabinet fuels committee.

The present recommended level of 220,100 bbl. daily in District 5 may be cut back for the last half of this year to as low as 150,000 or 155,000 bbl. a day.

The exact figure will depend on the committee's views on two points: How far present importers should be asked to cut back to make room for newcomers, and just how much is to be allowed the newcomers.

Recommendations on the new program were due to be sent the committee by Capt. M. V. Carson, Jr., administrator, last weekend. They are believed to provide lower quotas than requested to some of the 12 companies which asked for new or increased allowables totaling 45,100 bbl. daily.

The committee wants to announce the new program as early as possible so importers can have maximum advance notice of what they should bring in after June 30.

Move expected . . . Industry circles have expected for some time that quotas would be reduced.

They were warned by the cabinet committee last December this would

Unfinished Oil,

IMPORTS of unfinished gasoline and other unfinished oil products were put under the voluntary control program last week in a surprise move by President Eisenhower.

Officials denied that there was any relation between the new curbs and the fight in Congress for mandatory quotas on oil across the board. But it was expected that the move would strengthen support behind the administration's opposition to stiffening of Section 7 of the Reciprocal Trade Act.

The new order calls on importers to limit their entries of unfinished products through the rest of this year to the "currently prevailing" level. Imports are said to be running between 20,000 and 30,000 bbl. daily.

Individual company quotas are not expected to be set until public hearings have been held by Capt. M. V. Carson, Jr., program administrator.

Last week's action may have been spurred by charges by Sen. Ralph

Due Sharp Cut in Crude Imports Volume

be necessary if demand did not equal or exceed the estimates then before it.

A strong protest against any further cut in imports, however, was filed with Carson by Tidewater Oil Co.

Conditions which prevailed in District 5 early this year will not continue long, D. T. Staples, Tidewater board chairman, asserted.

"Imports and refinery operations will have to rise if gasoline demand is to be met," Staples predicted.

The District 5 program differs from that for Districts 1-4 in one important respect. It does not attempt to place imports on a fixed percentage of domestic production. The aim on the West Coast is to fill the gap between available domestic supplies and demand.

The committee last December placed this deficit at 180,000 bbl. daily. But to provide a reserve for possible increases in demand during the first half of this year it set the quota at 220,100 bbl.

Even with the additional 40,000-bbl. reserve, the level set by the committee was much below company estimates that imports would average 348,800 bbl. daily.

Actual imports, however, have been below expectations of both the committee and the West Coast industry. They have held close to the 150,000 bbl. daily line, and in April were only 140,100 bbl. a day.

Estimates vary . . . Company estimates for the last half of the year also run considerably above what Washington officials believe can be expected.

The more than 200,000 bbl. daily figured by the companies is not supported by Bureau of Mines estimates of production and demand, they say. And they do not feel that there is anything in the economic picture to indicate that much will be needed.

The new Four Corners pipeline is pointed out as one of the factors now to be considered in setting District 5 allowables. The line is reported to be moving around 60,000 bbl. daily, half of which will supplant imported crude.

Officials have given no indication of the extent to which present West Coast importers will be asked to cut their entries after midyear. Eighteen companies now have quotas. But eight of them, with total allowables of 24,800 bbl. daily, have not made any imports under the present program.

Tidewater's lengthy analysis of the West Coast situation took issue with the reasoning of the Oil Producers Agency of California in calling for a limit of 55,000 bbl. daily on imports.

The OPAC figure, it said, is based on the assumption that all wells in the area would produce at maximum capacity, the Four Corners pipeline would operate at full load (for the benefit of a few large companies) and Canadian gas would replace oil to a large extent in the Pacific Northwest.

The argument . . . The agency ignored two points, Tidewater charged. They were:

. . . The government's recommendation that a 15% productive capacity be maintained for defense reasons.

. . . The serious imbalances in products that would result.

Unbalanced product supply comes from the sharp drop in residual demand and the increase in gasoline and other light products. If West Coast refiners hold down residual output, they can't meet gasoline demand, and vice versa, it was argued.

"Any attempt by the cabinet committee to balance total barrels of oil supply with total barrels of oil demand in District 5 will create an impossible situation," Staples warned.

Tidewater's projection of 1958 demand, supply, and product-stock changes shows a need for imports of at least 154,000 bbl. daily.

A "reasonable rate" for foreign crude, however, would be the present quota of 220,000 bbl. daily, it was held.

Gasoline Placed Under Imports Program

Yarborough (D-Tex.) last month that unfinished gasoline was being imported to get around the curbs on crude oil.

Yarborough alleged that a "secret" ruling by the Customs Bureau allowed the product to be imported at the crude-oil tax rate of one-fourth cent per gallon instead of the five times greater gasoline tax rate.

As a result, the senator asserted, major importers are evading the crude controls and "lining their pockets with hundreds of millions of dollars at the expense of domestic producers" (OGJ, May 12, p. 80).

Study showed need . . . A cabinet committee study of products imports was recommended by Mobilization Director Gordon Gray May 28. The study was ordered by the President the same day.

The committee findings were reported to the White House exactly a week later, and were immediately approved.

The committee's study covered the whole field of products. It found that no action need be taken at this time with respect to imports of residual, distillate fuel, asphalt, or finished gasoline, but controls were needed on unfinished products.

"The committee believes that if commercial imports of unfinished gasoline and other unfinished oils increase beyond the currently prevaling level, such imports may constitute a threat to the voluntary program," the report said.

However, it stated further, the situation with respect to the import of products should be kept under constant review.

The committee noted that since its March 24 report recommending a ban on the letting of government contracts to companies violating their import quotas, government procurement agencies have revised their policies with regard to the purchase of products "including jet fuel."

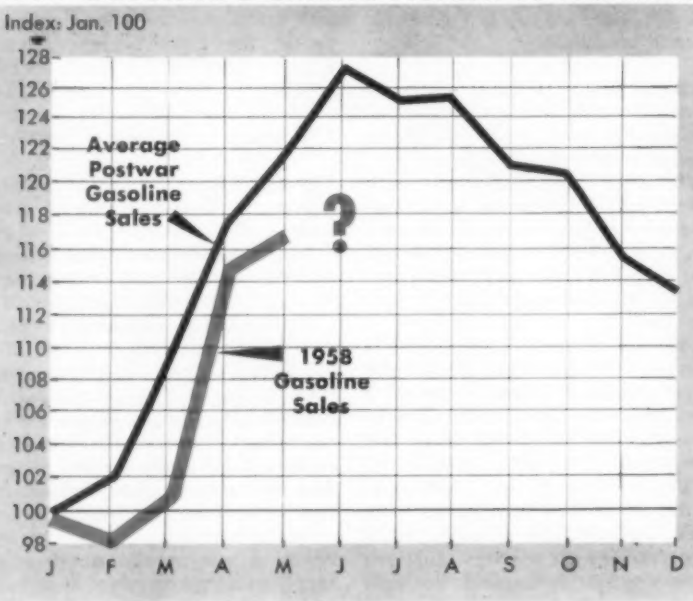
Mandatory program hit . . . Following the White House announcement of the new order, Commerce Sec. Sinclair Weeks, chairman of the cabinet committee, said that the group nearly a year ago recognized that the voluntary program could be nullified by excessive imports of various types of products. The curb is designed to prevent this.

Weeks used the order as the basis for a new plea against quotas in the trade act.

"The committee continues to consider that an effective voluntary program is preferable to mandatory controls, both from the point of view of national security, which requires the maintenance and growth of a healthy oil producing industry, and the safeguarding to foreign producers of their equitable participation in an expanding American market," he said.

Critical summer question:

Will Gasoline Demand Return to Normal?



Low Production, Normal Demand Equals Improved Stock Picture in June

(Thousands of barrels daily)

	1958*	1957
Total Production	7,115	7,882
Crude	6,340	7,107
Gas liquids	775	775
Total Imports	1,400	1,627
Crude	925	1,168
Products	475	459
New Supply	8,515	9,509
Total Demand	8,450	8,418
Domestic	8,180	7,974
Export	270	444
Stock Change	65	1,091
Crude	—22	278
Products	87	813
Refinery Runs	7,200	7,867

*Forecast.

Summer Driving Is Upturn Barometer

THE OIL INDUSTRY is entering a critical 2-month period which will tell whether petroleum will emerge from its own recession.

What happens in June and July also may give some good signs where the national economy is heading.

Both indications will come from the American motorist and the volume of gasoline he buys for vacation and summertime travel.

A big jump in demand for gasoline in July over last year will be considered a significant tipoff that conditions are improving both for petroleum and perhaps for general business as well.

Here's the picture so far this year for domestic gasoline demand (see chart) and the outlook for the critical period:

. . . **January through April** consistently trailed postwar average demand for the period. March particularly was off.

. . . **May also may be below normal** early reports indicate. This may change, however, when final figures are in covering deliveries for the Memorial Day weekend.

. . . **June demand** must hit 4,400,000 bbl. daily to be of significance. The reason is this: In the 1946-57 period, gasoline demand in June has been 27.7% higher than that for January. Demand for January this year was a little better than average. So the June figure must approach 4,400,000 bbl. daily to maintain its position.

. . . **July demand** must reach 4,202,000 bbl. and August demand 4,155,000 bbl. to equal last year's figures.

If the industry can sell enough gasoline in these 2 months to show a good gain over last year, it will be an important sign of an upward trend. Historically, domestic gasoline as measured by refinery deliveries, peaks in June, makes gradual declines until October, and then falls off sharply in the winter.

June supply-demand . . . If a booming summer gasoline business does develop, it will find the industry in much improved supply-demand position (table).

Forecasts indicate that total June demand of 8,450,000 bbl. daily will fall short of the 8,515,000 bbl. daily of new supply by only 65,000 bbl.

This 65,000 bbl. daily excess will move into storage. But the important part of the stock picture is this: Crude stocks will be lowered by 22,000 bbl. daily during June. Products will increase by 87,000 bbl. daily, mostly in the distillates and heavier fuels.

Comparison with last June shows how far the industry has come. In 1957, new supply was 9,509,000 bbl. daily against a total demand of only 8,418,000 bbl. daily. This meant 1,091,000 bbl. daily went to stocks, 278,000 bbl. daily into crude storage and 813,000 bbl. daily into products.

Refinery runs in June are expected to average 7,200,000 bbl. daily against last year's average for the month of 7,867,000. That's a decline of 667,000 bbl. daily.

Outlook for production . . . Crude output for June will reach 6,340,000 bbl. daily, up slightly over production for the last 3 months.

This will be increased by 775,000 bbl. daily of gas liquids and imports of crude and products totaling 1,400,000 bbl. daily.

Oil economists believe the normal winter increase in demand for petroleum will permit upward adjustments in crude production in the second half. They mention the possibility of stepping up Texas' producing days from the present 8 to 10 by late summer and maybe to 12 before winter.

Requests from purchasers at the latest Texas Railroad Commission ranged from 8 to 11 producing days for June. Many felt the time was near to come off the 8-day allowed production.

Crude buyers attending the proration hearing of the Oklahoma Corporation Commission also were optimistic about the outlook. Several reported taking more crude than nominated and that crude stocks previously excessive were being worked down.

Some refiners using Oklahoma crude have gone on the spot market, are buying trucked oil, and some purchasers have made new pipeline connections. They agreed the over-all outlook has improved since winter and that July will be the critical month.

Other good straws in the wind for producers:

Esso Standard Oil Co. increased its crude-oil purchases by 10% in Louisiana and Mississippi effective June 1.

Tally sheet on stocks . . . The industry has reached its present optimistic state by deep and costly slowdowns in the last 3 months.

In February total stocks of crude and four products totaled 57,248,000 bbl. more than the year before. By early June this had been cut to 1,648,000 bbl. under last year, an improvement of 58,896,000 bbl. (See p. 189).

The picture east of California is even more dramatic.

In February, crude and product stocks were 18,875,000 bbl. higher than 1957. But by early June they had been cut to 32,520,000 bbl. lower than the 1957 level.

This means a net improvement east of California of 51,395,000 bbl. in stocks. California managed to reduce its excess stocks by 7,501,000 from 38,373,000 bbl. in February to 30,872,000 bbl. in early June.

The trend last year was for stocks to increase far faster than they should. The trend for the past 3 months of this year is an abnormal reduction.

Oil economists now think normalcy is being achieved east of California and the outlook is good for cautious increases soon in refinery runs and crude production.

They emphasize that increases in refinery runs should be cautious. There is no shortage in refined products at this time. This is the season of the year when refinery production always exceeds demand with the surplus going to storage.

A big increase in runs this month could put refiners back in the unfavorable stock position they have been in for the past 12 months. Besides, product inventories can be built up later in the summer.

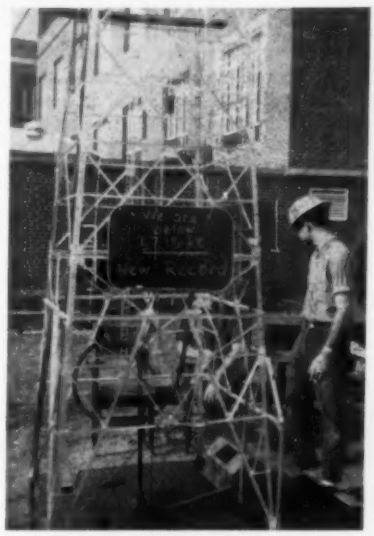
OU Sets Drilling Record, Too, Suh!

AMID ALL the hubbub created by the Texas well shattering the world's drilling record of 22,570 ft., there are those who may have missed the news that a new depth mark also was set on the University of Oklahoma campus at Norman.

Petroleum engineering students drilled to 58 ft., 2 in. the hard way—with a one-tenth scale model drilling rig and miniature rotary. The old record on the OU campus was 47 ft., 1 in., established in 1957.

The new record was reached in a total drilling time of 18 hours during the annual Engineers Open House. A sand was encountered at 35 ft. which produced a small amount of water.

Undaunted by the drilling feat of Phillips Petroleum Co.'s 1-EE University in Pecos County, Texas (see story on p. 69), proud PE Club members are planning to drill an offset next year to a depth of 100 ft.



OU's record well.

CIG's Rebate Offer Rejected

COLORADO Interstate Gas Co. continues to be stymied in its widely publicized effort to settle a 4½-year-old, multimillion-dollar dispute over natural gas rate charges.

The Colorado Springs, Colo., gas wholesale and transmission company, faced with Federal Power Commission inaction and a maverick Denver, Colo., mayor, has made three future rebate offers to a dozen customers in eastern Colorado, northern New Mexico, southern Wyoming, Iowa, and the Chicago area.

The latest, $37,300,000 on three rate increases by the company from January 1, 1954, to July 1, 1957, was accepted last week by Mayor Fred Simpson of Colorado Springs, which has its own gas distributing system. But the refund offer was rejected by Mayor Will Nicholson of Denver and the Public Service Co. of Colorado, which supplies the Denver area.

This spiked the proposed settlement, since the agreement was conditional upon acceptance of the same terms by other parties in the dispute and then by the FPC. The contestants previously had rejected a $24-million offer last January and a $32-million offer in early April.

Higher figure mentioned . . . FPC staff members indicated in April they would recommend the commission set the CIG refund at $41 million.

That figure resulted from the addition of FPC-ordered 6% interest to the $37,300,000 which the staff contended CIG collected unnecessarily.

The conditional agreement with Colorado Springs called for a decrease in gas rates after next July 1 of 15%.

The Denver mayor has previously demanded a refund of approximately $50 million, including interest, by July 1 and a rate reduction after that date of 20 to 25%.

Since January 1, 1954, CIG has collected $83 million in increased charges which are still subject to final review and decision by the FPC. These increased charges are mounting at the rate of $2 million a month.

And interest charges alone total about $6,000 every day of delay.

Four increases granted . . . The company's refund reserve now totals $16,300,000.

The Colorado Springs mayor, advocating quick settlement on CIG terms, said the company cannot afford to pay more than $37,300,000 and still retain a healthy financial condition.

CIG hasn't been able to issue a firm financial report since 1954. And the problem will keep growing constantly until the FPC rules on the dispute or until the consumers involved reach a settlement among themselves which is acceptable to the federal agency.

The FPC has allowed CIG four increases subject to possible refund.

Price-Fix Count Means Long Legal War

TWENTY-NINE U. S. oil companies are girding for a drawn-out battle against a federal price conspiracy charge that could, if it stands up, strike a blow at the foundations of the industry's established pricing system.

Attorneys for the companies do not expect the case to go to trial before next year, although the Government moved quickly to set arraignment for the defendants for Monday of this week.

The companies prepared to go into the federal District Court of Judge Albert Bryan at Alexandria, Va., with a variety of motions to quash the indictment.

They also are expected to file motions for a bill of particulars setting forth in detail what the Government charges. The companies contend the charge is based on conjecture, and there is no evidence of collusion in raising crude and gasoline prices during January, 1957, the period in question.

If the indictment is not quashed, the case will lay over until the summer court recesses end this fall. At that time a full-fledged fight to dismiss the charge can be expected.

Disposal of the many motions will take several months, and for this reason no trial—if one is held—is expected until next year. One leading attorney predicted the trial is at least a year and perhaps 18 months away.

Even the location of the trial is in doubt. It likely will be held at Alexandria, although the Government or the companies can request a change of venue.

Company strategy . . . The defendant companies can be expected to attack the makeup of the special grand jury which returned the indictment. A number of the jury's members were government employes, former government employes, or their wives.

Other irregularities in grand jury procedure also will be charged.

The indictment itself will come under company attack on the grounds that it is loosely drawn.

Because of the large number of companies involved, the pattern of the defense has not yet emerged. There is little likelihood that the companies will have a common counsel. Instead, each will have its own attorneys.

The cost of the defense will be monumental because of the necessity for each company footing its own legal bill. And the Government, too, will be spending huge sums to prosecute the case.

Joseph E. McDowell, a 20-year veteran of the Justice Department, will head a staff of six government attorneys in the prosecution. McDowell is a veteran of antitrust prosecutions and assisted the Alexandria grand jury in gathering information leading to the indictment of the oil companies.

Surprise? . . . The single charge of conspiracy by the grand jury at Alexandria apparently surprised the Justice Department more than it did the companies themselves. The companies were resigned to some action, but the government attorneys reportedly expected nothing more from the jury than a peg on which they might hang civil suits.

The Government may still file civil cases against the companies. A criminal suit aims at penalizing past offenses. But civil suits can result in injunctions against specified practices.

One leading oil executive took a different view of the indictment. He blamed the Justice Department directly: "I think the grand jury was led into the indictment."

What it means . . . Oil company spokesmen were positive in their denial that the increase in crude and gasoline prices in January, 1957, resulted from collusion or secret agreement.

The reason the companies met the price increase was simply to keep their sources of crude intact and stay in business.

As one executive put it: "We did it to keep from going broke."

The chief counsel for one company said it was "pure conjecture" on the part of the Justice Department that there was any agreement.

"I think it's purely the chronological course of events and the assumption that there must have been some collusion," the attorney said. "It was just the fact that the increase came along and others met it."

The president of one of the indicted companies is firmly convinced there is no tangible evidence to prove collusion and that if the companies are convicted, the long-standing pricing practices of the industry will be endangered.

"This is an attack on the basic well-known price program of the industry," he said. "It attacks the result of competition in the industry—when one group raises or cuts prices, others follow."

The same executive, however, is not particularly worried about the ultimate outcome.

"From the time factor, the price increase was a less concerted action than it was for other increases in the past. I would be inclined to think that, except for the annoyance and cost, this is a good case for us to defend. It is a very shallow indictment."

The charge . . . The indictment was returned by the Alexandria grand jury, which had been sitting for 15 months, as its last act before going out of business.

The one-count indictment alleges violation of Section 1 of the Sherman Act but does not name any individuals. The only penalty that can be imposed if the Government wins its case is a fine of not more than $50,000 against each company.

The jurors charged that the defendant companies "engaged in an unlawful combination and conspiracy to raise, fix, and stabilize the prices of crude oil and automotive gasoline" starting in 1956.

The alleged conspiracy covers the entire "affected market," defined as the entire United States except Arizona, California, Nevada, Oregon, and Washington.

The case is the first in some 20 years charging the oil industry with criminal price-fixing on a nation-wide basis.

The build-up . . . The grand jury was called after House and Senate committees investigated the European oil lift following the closing of the Suez Canal.

Targets of the committee were the crude-price increase and pricing policies of the industry generally.

The jury got off to a slow start, and this brought the resignation from the Justice Department of Horace L. Flurry, attorney in charge of the case. Flurry accused Justice officials of dragging their feet.

Before its work was completed, however, the grand jury heard more than 300 witnesses representing all phases of the industry.

Who's charged . . . Defendants to the indictment are 19 major companies and 10 of their subsidiaries.

Eighteen were defined as engaged in production, purchase, and sale of crude and the marketing of gasoline.

for Oil Firms

Three were defined as engaged in the purchase and sale of crude and the remaining eight as buying and selling crude oil and/or marketing gasoline.

Following are those indicted:

Standard Oil Co. (N.J) and three subsidiaries, Esso Standard Oil Co., Carter Oil Co., and Humble Oil & Refining Co.; Socony Mobil Oil Co., Inc., and its subsidiary, Magnolia Petroleum Co.; Standard Oil Co. (Ind.) and its subsidiary, Indiana Oil Purchasing Co.; Sinclair Oil Corp. and its subsidiaries, Sinclair Oil & Gas Co. and Sinclair Refining Co.; Cities Service Co. and its subsidiares, Cities Service Oil Co. and Arkansas Fuel Oil Corp.; Standard Oil Co. (Ohio) and its subsidiary, Sohio Petroleum Co.

Also: The Texas Co., Shell Oil Co., Gulf Oil Corp., Ashland Oil & Refining Co., Atlantic Refining Co., Continental Oil Co., D-X Sunray Oil Co., Monsanto Chemical Co., Ohio Oil Co., Phillips Petroleum Co., Skelly Oil Co., Sun Oil Co., and Tidewater Oil Co.

Drill Mark Deepens

at Phillips' West Texas well. Casing string planned next.

THE NEW world's champion deep well in Pecos County, Texas, paused late last week at 22,834 ft. for logging and then prepared to resume drilling toward its objective some 1,000 to 2,000 ft. away.

Phillips Petroleum Co. also is getting ready to run a combination casing string to eliminate nearly 12,000 ft. of open hole in the 1-EE University.

The casing probably will be run next week. It will consist of 7⅝-in. to the point where the open hole starts at 10,996 ft. and then 7 in. beyond.

The 1-EE University broke the world's depth record May 26 when it passed 22,570 ft., the former mark held by a South Louisiana well of Richardson & Bass (OGJ, June 2, p. 63). The new record holder is aiming toward the Ellenburger, expected below 24,000 ft.

Phillips said drilling is still proceeding satisfactorily, despite the great depth and the heavy risk involved in the open hole. The well was whipstocked at 19,965 ft. because of fish in the hole.

No important oil shows have occurred so far.

watching WASHINGTON

. . . with Bertram F. Linz

• Alaskan statehood faces tough test

ALASKA is halfway toward becoming the forty-ninth state. But don't give any odds that it will get all the way this year.

The bill to make Alaska a partner in the Union managed to slip through the House by at 42-vote margin after narrowly averting defeat.

It will have just as tough a time, and maybe a tougher time getting by the Senate.

Opponents of the bill, and they are many, may resort to gouging tactics to wreck it. One way to do this would be to tie in statehood for Hawaii, which the House doesn't want to take up until next year.

But another weapon, equally fatal, may be used. A hot issue in the form of a bill to limit the review powers of the Supreme Court may be offered by a southern senator as an amendment.

The House and Senate have never been able to get together on statehood for the two territories. The House passed a bill in 1950, but the Senate didn't act. Four years later the Senate voted another bill. This time, the House refused to act.

The bill now in Congress gives Alaska 102-million acres of land owned by the Federal Government, together with the mineral rights. That would pave the way for the new state to get into the oil business.

Showdown on the measure may come in the Senate this month.

• O'Mahoney attacks wildlife ban

INTERIOR DEPARTMENT rules barring oil and gas development in wildlife refuges may be unconstitutional.

Sen. Joseph C. O'Mahoney (D-Wyo.) says that Congress is the only body that can put up a no-admission sign against oil prospectors. And it has never turned this power over to the department, he asserts.

The ground rules for oil development on the public lands were laid down by Congress in the Mineral Leasing Act of 1920. Interior was directed to carry out the purposes of that law, but not to repeal it, O'Mahoney said.

"And the January regulations do repeal the Oil and Gas Leasing Act so far as exploration for oil and other minerals on the public domain is concerned," he said in a letter to Sec. Fred A. Seaton.

O'Mahoney's main fear is that the wildlife ban will be used as a precedent for future Interior heads to disregard Congress. If wildlife is to be protected against oil developers it should be done in a more legal way, he feels.

• Rehearing sought in Midwest case

SOMETHING NEW has been added to the already complex Midwest pipeline case.

The Federal Power Commission is asking a rehearing of a District of Columbia Circuit Court decision that it had to hold "comparative" hearings on two applications of Natural Gas Pipeline Co. of America and Midwestern Gas Transmission Co.

Natural asked for a gas-supply increase of 485 million cubic feet daily to the Chicago area. Midwestern asked for a new line from Portland, Tenn., to the Canadian border.

The court held the applications were mutually exclusive. The FPC says they aren't. And it indicates it will take that line all the way to the Supreme Court, if necessary.

Chairman Jerome K. Kuykendall says the FPC won't hold up its action in the Midwest case to wait for a final court decision. But the Justice Department has indicted three of the lines involved on charges they conspired to keep a fourth out of the Midwest area. They may tie things up.

Hunt Has Strike Off Texas

TEXAS appears assured finally of another commercial oil field offshore.

Hunt Oil Co.'s 1 State Tract 20-S off Jefferson County, roughly 7 miles southwest of the town of Sabine Pass, was reported flowing oil at a rate of about 150 bbl. daily from perforations at 7,189-93 ft.

Hunt has clamped down on releasing information on the well, declining to identify the producing zone or to give data on flow tests. But company sources confirm that the wildcat has found commercial oil and should make a good producer.

The discovery, about 2 miles off the Texas coast, is located in the eastern portion of a 5,760-acre Hunt lease block. It is 1,976 ft. from the east line and 1,990 ft. from the north line of 640-acre Tract 20-S. Total depth is 9,915 ft.

Nearest offshore oil production to the strike is off Cameron Parish, Louisiana. Nearest gas production, however, is just about 5 miles south where Magnolia Petroleum Co. has several wells shutin in State Tracts 9 and 10.

Potential test on the Hunt strike, the company says, will not be taken for about a month. The company plans to acquire a site onshore for tanks and lay a line to them from the well. It will take a month, it thinks, to get this done. It indicated it would release no data on the well before this.

Near first offshore oiler . . . Geologically the Hunt strike is located astride a deep-seated salt dome and is only a mile east of Texas' first offshore oil production.

This was brought in in Tract 19-S by British-American Oil Producing Co. in 1940. BA drilled several wells between 1940-42 but all were small producers and were short lived. Production problems forced their abandonment within a few years.

The BA wells, a Hunt source says, were on the crest of the structure while the Hunt strike is more on the flank. None of the wells drilled in the area to date have gone into the salt.

First strike this year . . . The Hunt discovery is the first of any kind off Texas this year.

The last previous find was a dry gas strike last December off Matagorda County. This was the Michael 1 State Tract 449-S about 5½ miles southeast of Sargent.

Texas now has 10 offshore fields (see p. 103). Hunt's discovery could be the eleventh.

Lake Huron Island Leased

IMPERIAL OIL, Ltd., has acquired oil and gas permit rights on 45,000 acres of untested land on Ontario's Manitoulin Island in Lake Huron at a price of just over 1 cent per acre.

Imperial's successful bid of $482.25 for the tract means an oil exploration in a new area of Canada. There is no production or drilling on the island or nearby.

The permit was issued by the Indian Affairs Branch of the Department of Citizenship and Immigration in Ottawa and covers Indian Reservation No. 26 on Manitoulin Island.

Imperial must pay $9,000 rental the first year, plus a $20 fee. The north boundary of the area is the south boundary of Concession 3 Wikwemikong Township. The south boundary is a line between Concessions 3 and 4 in South Bay Township and Concessions 14 and 15 in Kaboni Township.

Gas Line Gets Nod

for big expansion project in Oklahoma's Laverne area.

MICHIGAN Wisconsin Pipe Line Co. last week won a Federal Power Commission examiner's nod for an expansion based on gas for which it's paying 17 cents an M.c.f., a record price in Oklahoma.

Examiner Howell Purdue recommended that the FPC approve a 56-mile 20-in. pipeline and compressor capacity between Michigan Wisconsin's main line and Laverne field in Harper County. The program, to cost $19.5 million, also includes a 20.5-mile loop of its 22-in. line to the Austin storage field in Michigan.

Purdue said Laverne reserves were sufficient to support the 40,000-M.c.f. daily expansion planned by the company. Laverne reserves, in testimony before FPC, were estimated at 319 billion cubic feet.

It is also probable that the Laverne supply will offset some of the drop in Hugoton gas available to the company, which Purdue said will be serious after 1965.

Purdue's report covered only the expansion which Michigan Wisconsin wants to get under way as soon as possible. None of the additional gas is to be sold for firm service until after further hearings which are to begin July 8.

The company proposes to deliver 10,000 M.c.f. daily to Michigan Consolidated Gas Co., an affiliate, and divide the remaining 30,000 M.c.f. among other customers.

Producers in Laverne field will build a gasoline plant with capacity up to 100,000 M.c.f. daily, to be operated by Sun Oil Co., largest acreage holder in the Harper County reservoir.

Other producers include Pan American Petroleum Corp., Sinclair Oil & Gas Co., Cities Service Oil Co., Shell Oil Co., Union Oil Co. of California, Oklahoma Natural Gas Co., Kerr-McGee Oil Industries, Inc., Anderson-Prichard Oil Corp., and certain smaller interests.

Subsidence Plan Speeded Up

. . . by Long Beach as Congress studies costly repairs. New $23,500,000 "crash" program will begin soon.

LONG BEACH officials last week approved a $23.5-million crash program for unitization and repressuring Fault Blocks II and III in Wilmington field.

This is the area of the greatest subsidence in the field, and the area which includes the huge Long Beach Naval Shipyard.

The program is designed to halt subsidence and restore reservoir pressures in the two fault blocks within 5 years.

The "crash" element was tagged on the measure in the face of two recent actions in Washington:

. . . **Efforts to pry $500,000** out of Congress for subsidence damage repair at the Navy base hit a snag when Sen. John Stennis (D-Miss.), chairman of the Senate armed-services subcommittee, said of the Navy request: "I see no reason why the Navy should throw good money after bad."

Stennis suggested shutting down the base entirely and moving it elsewhere.

. . . **F. Trowbridge vom Baur,** general counsel for the Navy, said the Navy was not satisfied with the recently enacted California antisubsidence law. He said the Navy has asked the Justice Department to start legal action to shut down production in the field and that the possibility of a damage suit against operators is still being studied.

Crash program . . . Faced with these threats to operators in the field and to the economy of the community if the base is shut down, the city gave unanimous approval to the crash program including these main points.

. . . **The two fault blocks** will form separate units with cooperative operations.

. . . **The 28-operator** town-lot area will be unitized as quickly as possible. These 28 operators produce only about 10% of the crude in the two fault blocks.

. . . **The usual preliminary studies** and pilot operations will be skipped and a full-scale flood started as quickly as the engineering can be worked out.

. . . **The city will advance operators** the difference between the costs of a normal starting procedure for a flood program and the increased costs expected to result because of the "crash" nature. These costs will be repaid from increased production expected from the secondary-recovery features of the repressuring and flood programs.

. . . **Existing water floods** will be expanded as rapidly as possible on a cooperative basis.

In addition to the city's approval, the crash program has the support of the major operators in the two fault blocks. These operators, who control more than 90% of the production in the two blocks, are Long Beach Oil Development Co., Union Pacific Railroad Co., General Petroleum Corp., and Southern California Edison Co.

The plan is aimed at injecting 710 million barrels of water into the two fault blocks in the next 5 years. Currently, a total of 22,000 bbl. daily are being injected into the two blocks. The new injection program will start by January 1. Total cost of the project is estimated at $23,500,000.

The Navy has indicated it will probably hold back on its lawsuits if this new program for Fault Blocks II and III shows sufficient progress in the coming months.

Navy base damage . . . The Navy has frequently threatened to shut down the huge base.

The economic impact on the "Navy town" of Long Beach would be severe. The base employs nearly 7,000 workers from Long Beach alone.

To repair subsidence-damaged facilities at the base, the Navy spent $11,387,000 through 1957. Another $3,685,000 may be required this year. Future costs are estimated at an additional $14,932,000.

These figures include subsidence damage only. Replacement cost of the base itself would amount to about $100,000,000 if the Navy decides to shut down the base and move elsewhere.

API Picks Public-Affairs Chiefs

THE OIL INDUSTRY'S public-relations program was beginning to take on its much talked-about "new look" last week.

The American Petroleum Institute announced appointment of a spokesman for the industry in Washington and named a new 19-man committee to direct the activities of governmental and public relations.

Frank L. Dennis, Washington newspaperman and lawyer, will fill the API's newly created post in Washington. He will be special assistant to Frank M. Porter, API president, effective July 1.

Appointment of the new committee on public affairs is part of the long-range plan to merge the API's Oil Information Committee and American Petroleum Industries Committee.

Both the OIC, which is the public-relations branch of API, and the APIC, which is concerned with governmental matters, will be dissolved by September 1. After that the new committee will direct those activities.

Thomas W. Phelps, assistant to the chairman of the board of Socony Mobil Oil Co., New York, and national chairman of the OIC, is chairman of the new public-relations committee. John H. Bivins, director of the APIC at New York, has been named staff director of the new setup.

Washington job . . . Dennis, the man who will push for a better climate for oil in Washington, has been serving as director of the press and publication service of the U. S. Information Service.

Frank L. Dennis
. . . API's new man in Washington

A graduate of the University of Oklahoma and Harvard Law School, he has been executive editor of the Daily Oklahoman, the Boston Herald, and the Washington Post.

He has served as the Marshall Plan's director of information for Europe. He also was public-affairs officer with the rank of counselor at the embassy in Rome. Before his present assignment with USIS, he was director of public relations with that agency.

Craft Lines Disappear

. . . in Bayonne refinery's maintenance and construction crews. Instead men are all-around refinery mechanics.

REFINERY-MAINTENANCE workers are more efficient and have a greater personal satisfaction in their work under a system where craft lines are forgotten and teamwork by skilled craftsmen is stressed.

That's the report from management at Esso Standard Oil Co.'s Bayonne, N. J., refinery where the system has proved effective. It is called the zone supervisor system.

The plan works like this: Each supervisor is assigned a specific area of maintenance responsibility. He heads a crew of about 12 men. Crew members have among them all the necessary maintenance and construction skills needed around a refinery. The exceptions are electricians and instrument men. They are supplied by a separate refinery division along with shops and transportation.

Crew members are designated maintenance and construction mechanics. At present Esso has three classifications: Helper, second class M & C mechanic, and first class M & C mechanic. As workmen are trained and promoted from the second class, it will nearly disappear.

The crews tackle any maintenance or construction job in their areas. The workers help each other without regard to craft lines. The result is speed and efficiency which save both time and money.

How system developed . . . The zone supervisor system resulted from a series of projects undertaken at Bayonne over the last 10 years.

It is the direct outgrowth of a work plan called multiskill supervision. This system was instituted last year when the refinery mechanic concept was first discussed with mechanical foremen.

In Bayonne's lexicon, a refinery mechanic means a workman who has at least one of the craft skills but also performs all kinds of semiskilled work.

At first mechanical foremen were found under the multiskill plan to lack confidence in their ability to supervise all crafts. A majority, however, felt that they could supervise related crafts.

From the 14 different craft promotional units with about 90 classifications, Bayonne executives came up with four groups of related crafts. This organization called for foremen to supervise trades in these groups. No attempt was made to revise the promotional units.

Two moves were made to enlist supervisor support. They were

. . . Encouraged to show interest in activities of more than one craft.

. . . Asked to permit workers to do what they had the skill to do.

This type of operation was so successful that Bayonne experienced a 20% over-all improvement in maintenance and construction operations during the time it was in effect. Another plant claimed a 37% reduction in maintenance manning.

The crews, composed of men chosen from the various classifications so that all necessary skills are represented in each one, became integrated groups.

There was evidence that this improved morale. In fact, after the system had been in operation for several weeks, union and management worked out a new agreement. It created a single promotional unit for all maintenance and construction workers, the previously mentioned "M & C mechanics." A mechanical rate increase also was granted.

A minor change . . . The present zone supervisor system represented only a slight change from this multiskill plan.

Practically the only difference was giving the supervisor a definite area of responsibility.

E. B. Lanier of the Esso Bayonne refinery, in discussing the development of the refinery mechanic idea, recently declared Esso tried the zone supervisor system several years ago. But at that time it was imposed on the basic craft-line organization with a general foreman heading each trade.

Coordinators or regional engineers were placed in charge of geographic areas in the plant. They had direct supervision of tradesmen working in their area. Foremen became mainly personnel administrators.

The result was closer field supervision but diluted supervisory craft know-how.

Last year the refinery-mechanic idea evolved, and this led to multiskill supervision and today's program.

Sour Gas To Get Outlet

WORK will start this month on an $8-million, sulfur-recovery plant processing sour Okotoks gas about 12 miles southeast of Calgary. The joint project of Devon-Palmer Oils Ltd. and Texas Gulf Sulphur Co., Inc., will process 30,000 M.c.f. of raw gas per day to produce 12,000 M.c.f. of residue gas and 370 long tons of sulfur.

Delivery of 10 miles of 10-in. pipe began last week. It will tie in six proven wells making gas containing 34% hydrogen sulfide. Okotoks, discovered in 1951 by Shell Oil Co., has reserves enough to feed the plant for 35 to 40 years. The present wells will serve plant requirements for 11½ years.

PROCESSING BRIEFS...

Ethyl Corp. and Du Pont reduced the price of TEL effective June 3. New prices in cents per pound of TEL are: Motor mix, 58.98; motor mix plus and motor mix A, 59.98; and aviation mix, 64.88.

The Texas Co. officials have decided against closing the 8,422-bbl. refinery at Sunburst, Mont. The plant will continue to operate indefinitely, but at a reduced level. Texaco had been planning since last year to shut down the refinery next October and transfer eligible employes to its new refinery at Anacortes, Wash.

Richfield Oil Corp. has completed a $6.5 million benzene toluene unit at its Los Angeles refinery. The unit, which doubles the West Coast output, will produce 18 million gallons of nitration grade benzene annually and the same amount of toluene. Built by Fluor Corp., it will process 6,100 bbl. per stream day of a select C_6-C_7 straightrun gasoline fraction from the refinery.

Delta Refining Co. has completed one phase of an extensive plant expansion at Memphis with the startup of a UOP "HF" alkylation unit. The refinery's catalytic cracking unit produces the new unit's charge stock, isobutane and butylenes. The alkylation unit produces 760 bbl. per stream day of 105-106 octane leaded alkylate for use as a gasoline blending component.

Esso Standard Oil Co. is meeting steam requirements at its Bayway, N. J., refinery by swapping fuel and water for steam from Public Service Electric & Gas Co. Esso has signed a 20-year agreement to supply Public Service's generating station at nearby

Unusual Floods Dot Kansas

THERE is growing realization that some form of secondary recovery can be applied to virtually any oil field.

This fact was pointed up forcibly in the annual tour of the Kansas-Oklahoma Water Flood Association last week in Cowley County, Kansas. Four water-flood projects were inspected. Each was distinctive and largely different from the usual properties now being operated in the Mid-Continent.

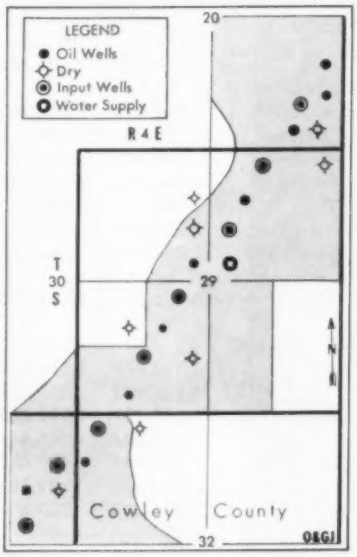
More than 300 oil men participated in the field trip which was made by arrangements with the Petroleum Experiment Station of the U.S. Bureau of Mines, Bartlesville, and J. P. Powell, J. L. Eakin, K. H. Johnston, and C. H. Riggs, Bureau of Mines engineers.

The Cowley County, Kansas, area for 35 years has been principally Bartlesville sand territory. The county lies on the western edge of the large central Mid-Continent water-flood area that stretches north and south over 200 miles from Eureka, Kans., to the Cromwell-Seminole area of central Oklahoma.

These four unusual floods were inspected by the visiting oil men during the tour:

... The Stelbar Oil Corp., Inc., project in Rock field comprises 460 acres in sections 11-16, 30S-4E, with an average of 20 ft. of sand.

The flood was developed in a narrow, 2-mile-long shoestring bar. Width of the field varies from only one location to a maximum of ½ mile.



ONLY ONE location wide, Cooperative Refinery Association's Rock Unit 3 is one of the most unusual water floods in Kansas.

From the beginning of the flood in 1951 through February 1958 the project has resulted in production of 923,000 bbl. of oil. There are 22 active producers within the unit, and 18 water input wells.

Two separate water pressure plants are used. Three water supply wells were drilled to the Stalnaker sand at 1,850 ft. The Stelbar project is characterized by its simplicity of layout and profitable results.

... Cooperative Refinery Association's project is also located in Rock field. The Bartlesville sand bar ranges from 2,786 to 2,820 ft. in depth and is 18 ft. thick.

This is possibly one of the most unusual water-flood projects ever developed in Kansas. The shoestring bar is only one location wide, although it is more than 2 miles long.

The operator selected a water-flood sweepout pattern wherin the injection wells alternate with the oil wells (see drawing). From mid-1955 through February 1958, the flood has resulted in production of 41,400 bbl. of oil.

The unit has nine producers and eight water input wells. The one water supply well is near the center of the unit.

... Anderson-Prichard Oil Corp.'s 330-acre Bartlesville sand project is at 2,875 ft. and includes 30 ft. of pay. Unusual feature is the development program.

Wells arranged in a peripheral flooding pattern were selected for input service. This is one of the few times that such a "squeeze" arrangement has been used in Kansas. Good results have been achieved in the 1 year the flood has been in operation.

... Aladdin Petroleum Corp.'s 200-acre flood is the deepest of the four inspected. Pay thickness averages 25 ft. and is found at 3,400 ft. Water supply is deep, coming from Arbuckle limestone at 3,600 ft.

Linden with high-viscosity residual fuel and raw water. The station's normal fuel requirement is 16,000 bbl. daily.

In exchange, Public Service will supply the refinery with as much as 1,550,000 lb. of high and low-pressure steam per hour. Esso also buys electric power from the company at wholesale rates. The deal assures Esso of a market for a very heavy residual fuel and a reliable and economic supply of steam and electric power without a major capital investment.

Hancock Oil Co. has contracted with C. F. Braun & Co., Alhambra, Calif., and Ralph M. Parsons Co., Los Angeles, to analyze the damage and make recommendations for replacements at its blast and fire riddled refinery at Signal Hill.

A new asphalt storage and distribution terminal at Louisville, Ky., has been completed by Ashland Oil & Refining Co., Ashland, Ky. It is the company's second river terminal for asphalt products.

Engineering work has started on an HF alkylation unit as a part of a $2,400,000 expansion program at Carter Oil Co.'s refinery at Billings, Mont. The new unit is to be constructed by Refinery Engineering Co. of Tulsa. Completion is slated in early spring 1959.

Also for Refiners . . .

IN THE NEWS: Unfinished products have been ordered included under the voluntary imports control program (p.64) . . . A sharp reduction is scheduled in the volume of crude imports on the West Coast for the last half of the year (p.64). . . What happens to gasoline demand in June and July will be the tipoff whether oil is emerging from its recession (p.66). . . Twenty-nine U.S. oil companies are girding for a long legal battle against federal grand jury indictments (p.68). . . Esso gains efficiency and higher morale at Bayonne by eliminating craft lines and creating refinery mechanic classification for maintenance and construction crews (p.72). . . Gasoline consumption hit all-time record in 1957, annual API report shows (p.74). . . Murphy Corp. is negotiating for Lake Superior Refining Co. (p.74). . . OCAW proposes 36-hour week in negotiations just starting with Sinclair Refining. Union also wants a pay raise plus no loss in take-home pay (p.77).

PLUS THIS TECHNICAL REPORT: The computer in the feedback loop of a control system (p.115). . .

1957 Gasoline Sales Across the U. S.

(Thousands of Gallons)

	1957	1956
New England		
Connecticut	725,617	693,553
Maine	313,516	299,605
Mass.	1,325,892	1,268,927
N. H.	197,059	184,629
Rhode Island	242,314	234,835
Vermont	123,762	121,718
Total	2,928,160	2,800,264
Middle Atlantic		
Delaware	183,443	155,526
Maryland	835,222	820,070
New Jersey	1,840,868	1,846,099
New York	3,923,969	3,710,039
Penn.	3,113,578	2,989,211
Virginia	1,240,026	1,198,877
W. Virginia	499,856	482,601
Dist. of Col.	198,012	204,258
Total	11,834,974	11,406,681
Southeast		
Alabama	911,243	886,817
Florida	1,674,124	1,533,671
Georgia	1,194,990	1,169,369
Mississippi	604,440	610,052
N. Carolina	1,336,306	1,311,886
S. Carolina	673,644	664,152
Total	6,394,747	6,175,947
Southwest		
Arkansas	547,622	552,456
Louisiana	909,346	876,621
New Mexico	404,976	374,584
Oklahoma	939,609	943,706
Texas	4,413,299	4,495,889
Total	7,214,852	7,243,256

	1957	1956
Midwest		
Illinois	2,909,898	2,814,200
Indiana	1,719,957	1,717,711
Kentucky	864,500	817,727
Michigan	2,564,926	2,485,520
Ohio	3,129,091	3,070,573
Wisconsin	1,243,382	1,214,190
Tennessee	1,064,812	1,036,984
Total	13,496,566	13,156,905
North Central		
Iowa	1,126,909	1,118,544
Kansas	1,034,972	1,039,569
Minnesota	1,239,727	1,202,253
Missouri	1,603,377	1,601,864
Nebraska	581,444	569,003
N. Dakota	314,231	304,501
S. Dakota	335,272	326,654
Total	6,235,932	6,162,388
Rocky Mountain		
Colorado	662,853	638,147
Idaho	260,062	255,445
Montana	290,053	291,012
Utah	312,640	302,813
Wyoming	167,288	163,797
Total	1,692,896	1,651,214
Far West		
Arizona	419,813	390,382
California	5,461,712	5,333,638
Nevada	135,283	129,118
Oregon	633,611	641,222
Washington	953,997	931,391
Total	7,604,416	7,425,751
U.S. total	**57,402,543**	**56,022,406**

Gasoline Use Hits New Peak

CONSUMPTION of gasoline in the U. S. hit an all-time record of more than 57.4 billion gallons in 1957, but the gain from the previous year was the smallest in a decade.

The API's annual state-by-state comparison shows that consumption last year was up 1,380,137,000 gal. from 1956.

California, with 5.4 billion gallons, continued to lead all states by a wide margin. Texas was second with 4.4 billion and New York third with 3.9 billion. The only other states to top 3 billion gallons were Ohio and Pennsylvania, each with 3.1.

Eight states and the District of Columbia were actually down from 1956. The states were Arkansas, Kansas, Mississippi, Montana, New Jersey, Oklahoma, Oregon, and Texas. Texas, down 82,000,000 gallons, was the worst hit of all.

New England gains . . . Biggest sectional gain last year was in New England, up more than 4.5%.

Other good gains were shown in the Middle Atlantic states, up 3.7%, and the southeastern states, up 3.5%. The only declines in the entire East Coast area were in New Jersey and the District of Columbia.

The only section to show a loss was the Southwest. Three of the five states showed declines from 1956—Texas, Arkansas, and Oklahoma. These declines were more than enough to offset fair gains in Louisiana and New Mexico.

The seven-state Midwest area made up the best regional market, consuming nearly 13.5 billion gallons. Seven Middle Atlantic states and the District of Columbia were second with 11.8 billion gallons. However, the most concentrated market is the New York-Pennsylvania-New Jersey area where consumption totaled better than 15% of the entire national demand.

Refinery Sought

by Murphy by trading stock with Superior, Wis., firms.

MURPHY CORP., El Dorado, Ark., producing and exploration firm, may get in the refining business.

Murphy is negotiating to acquire control of Lake Superior Refining Co. in a stock exchange deal. Lake Superior operates a 13,000-bbl. refinery at Superior, Wis.

The Arkansas firm currently markets refined products, but has no refining facilities. If the deal with Lake Superior is completed, Murphy has no immediate plans to refine any of its own crude at the Superior refinery.

The Murphy prospectus provides that six shares of Murphy common will be exchanged for each share of common of Lake Superior Refining and of Superior Refinery Owners, Inc. The refinery is owned by Superior Refinery Owners and is leased and operated by Lake Superior Refinery.

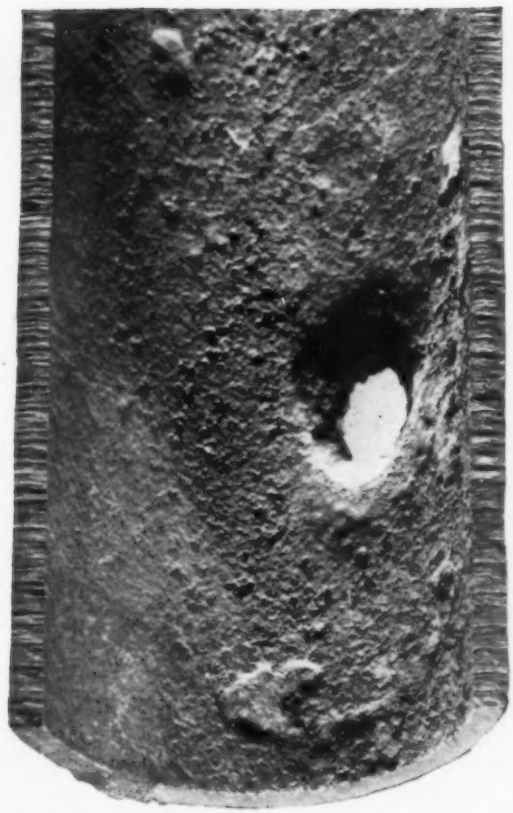
The offer states that holders of at least 95% of common shares of the two Superior firms must agree to the stock exchange. The offer expires June 9. Murphy reserves the right to lower the 95% requirement to 80% and change the expiration date to as late as June 23.

Nebraska LPG Flood Begins

THE DENVER basin's first miscible-phase displacement project is under way in Johnson field, Cheyenne County, Nebraska.

Ohio Oil Co. hopes to recover an additional 1,000,000 bbl. of oil from the 7-year-old field, which has already produced 1,300,000 bbl. from both the D and J sands.

If the $250,000 experiment is successful, officials said units will be formed in other fields in that region for similar programs. Definite results of the 50,000-bbl. propane flood will not be known for possibly 18 months.



Sulfate reducing bacteria, cause of corrosion that penetrated this brine line, can now be controlled. New Nalco 322 prevents this attack, in brine, as effectively as does Nalco 321 in fresh water systems.

ANOTHER NALCO SYSTEM PLUS . . .

In Waterflooding: Strict Control of Sulfate-reducing Bacteria In Brine as well as Fresh Water Systems.

STOPS ➤ **Pitting Corrosion**
Iron Sulfide Sludge Formation

Controlling sulfate-reducing bacteria in fresh or brine water injection systems is an integral part of Nalco treatment for waterflooding . . . along with efficient clarification, scale prevention and corrosion control.

Effective, *economical* control of sulfate-reducing bacteria in waters of high chloride content is a new development in water treatment practice . . . one you should certainly investigate if sulfate-reducer control costs are running high — or effectiveness is less than excellent.

Write or call for action today. Ask about new Nalco 322.

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THROUGH PRACTICAL APPLIED SCIENCE

Case Report on "Craneloy 20" Gate at D-X Sunray Refinery

Best valve performance ever on toughest acid service . . .

. . . So says the D-X Sunray Oil Co. about this "Craneloy 20" gate on sludge draw-off at the big West Tulsa refinery.

Installed at the agitator bottom, this 6-inch Crane valve is handling various hot sulphuric acid sludge mixtures—concentrated and weak—steam-diluted to as low as 30%.

Valves used previously had to be replaced every 3 to 6 months. But this "Craneloy 20" gate went a full 14 months before minor repairs—then was put right back into service. It has the best record of any valve used on this toughest job in the refinery.

Specially developed for sulphuric acid at elevated temperatures, "Craneloy 20" is a high-nickel, high-chromium stainless. Teamed with Crane split-wedge, rotating-disc seating design, it makes a valve no corrosive fluid processor can afford to overlook for truly low-cost flow control.

GET FULL FACTS on "Craneloy 20" and other Crane quality alloy valves and fittings. Ask your Crane Representative for Circular AD-2080, or write to address below.

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Vital Labor Talks Start

. . . in Kansas City this week between OCAW and Sinclair. Union wants 36-hour week for members, may set pattern.

THE FIRST proposal for a shorter work week in the oil industry will be explored by Sinclair Refining Co. and the Oil, Chemical and Atomic Workers International Union when they open 1958 contract negotiations this week in Kansas City.

The 9,000 OCAW members employed in Sinclair refinery, pipeline, production, and research operations are seeking a 36-hour week with no cut in take-home pay.

This is in addition to the mandatory program laid down by the union's bargaining policy committee last February for 105,000 members employed in oil and related industries. These goals include a wage increase to compensate for the higher cost of living since 1957 wage adjustments, 3½% annually for greater productivity, and sizable raises in severance pay for laid-off workers.

The Sinclair negotiations also will include demands by the union for improvements in pension, sick and accident, and savings plans.

OCAW's master agreement with Sinclair is the union's only nation-wide contract in the oil industry. Bargaining with all other companies is conducted on a plant-by-plant basis.

Wage reopener . . . The union's current contract with Sinclair, signed last year, is effective until June 14, 1959, but may be opened at midterm for renegotiations on wages and hours.

The pension plan and the sick-accident program expire at midnight, June 14, 1958. The savings plan runs out October 1, 1958.

The demand for a shorter work week by Sinclair employes is the first made since OCAW President O. A. Knight announced last November that reduced work schedules might be necessary to offset the threat of automation and heavy layoffs.

The Sinclair negotiations also are the first in 1958 for OCAW with a major oil company and may set the national pattern. Until now the union's demands have been taken under advisement with no indication as to when the bargaining would start.

OCAW's wage proposals total about 19 cents an hour. Last year the union sought 27 cents an hour but settled in mid-May for 6%.

Foes Renewing Depletion Fight

SENATE FOES of the oil depletion allowance are gathering strength for a new attack on the 27½% rate.

A number of bills to reduce the rate to 15% have been offered by senators. They will attempt to have the rate reduced when tax legislation comes up in the near future.

Most vocal opponent of the present allowance has been Sen. John J. Williams (R-Del.). Last week, Sen. William Proxmire (D-Wis.) said he also would offer an amendment to cut the rate.

Administration opposition to any tinkering with the depletion provisions at this time has been made known to the Senate finance committee by both the Treasury Department and the Budget Bureau. The latter is a direct arm of the White House.

The Treasury report warned against any change in the allowance for oil and gas without a full study of the entire subject.

Such a study together with "extensive congressional hearings" would be needed to decide whether the rate should be changed, the committee was told.

The cut in the rate for oil and a score of minerals covered by his bill would bring an additional $500 million to the Treasury, Proxmire said.

Douglas has bill . . . Williams' bill is backed by four other senators. But a separate bill has been offered by Sen. Paul Douglas (D-Ill.) which, while limiting big producers to a 15% rate, would grant higher rates to smaller operators.

The Douglas bill would leave the present rate untouched for producers with an annual income of less than $1 million and cut it only to 21% for those with income between $1 million and $5 million.

Several tax bills are due to come before the Senate in the next few weeks. A bill already passed by the House, making technical changes in the revenue code, is now before the finance committee. Extension of the 52% corporate tax and the wartime excessive levies also is ready for the committee. And the House ways and means committee is now studying tax relief for small business.

Backers of the depletion cut will try to induce the committee to put it into one of these bills. They probably will fail. In that event they will offer it as an amendment on the floor.

Firms Swap Stock

in move to finance Florida's multimillion-dollar gas line.

A NEW corporate structure and a favorable ruling by the Supreme Court have cleared the way for financing of a $175-million, 1,500-mile natural-gas line from McAllen, Tex., to Miami, Fla.

Houston Corp., parent firm of Houston Texas Gas & Oil Corp. and Coastal Transmission Corp., which have certificates to build the line, is ready to file a registration statement covering issuance of debentures and common stock.

The latest forward step for the long-delayed project, approved by the Federal Power Commission over a year ago, was agreement to place the entire project under one corporate roof. Coastal stockholders agreed to exchange all their stock for 542,234 shares of Houston Corp. capital stock.

Stockholders of Delhi-Taylor Oil Corp., which organized Coastal to build the section of line from McAllen to Baton Rouge, have the right to acquire at a later date 515,123 shares of the total Houston shares to be received in the exchange.

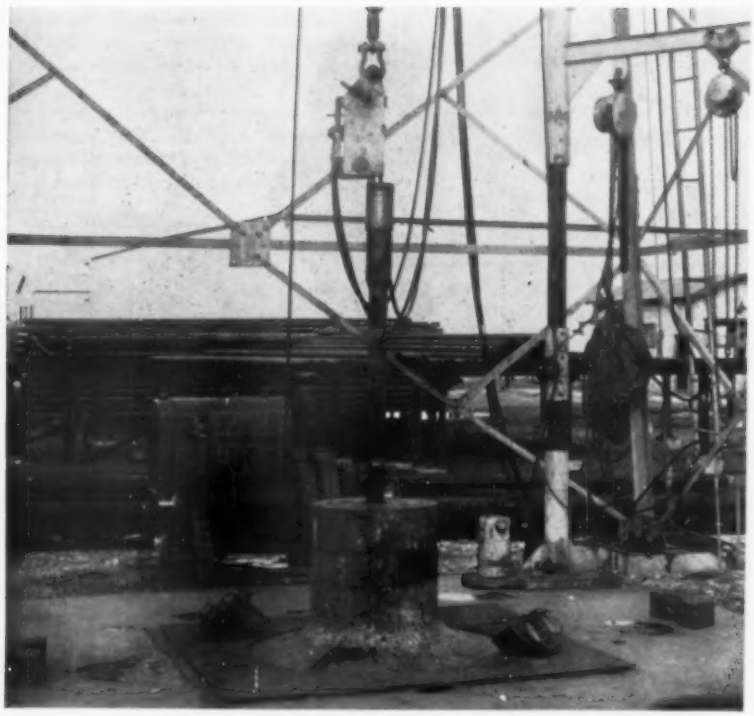
The stock exchange was approved a week after the Supreme Court cleared the last legal obstacle to the line by denying a petition for certiorari filed by a group of fuel-oil distributors in Florida (OGJ, May 26, p. 68).

Louisiana House Hikes Tax

THE LOUISIANA HOUSE of Representatives last week passed a bill which would double the state's gas-gathering tax.

The measure received a bare two-thirds majority required for adoption of a new tax. It was called up for reconsideration after failing by only two votes on an earlier roll call.

As originally drawn, the bill would have raised the gathering tax from the present 1 cent to 3 cents per M.c.f. (OGJ, May 26, p. 55). It was later amended to provide a tax of 2 cents per M.c.f. The measure has the support of Gov. Earl K. Long and the public school bloc. It now goes to the Senate.



DRILL PIPE drops 28 ft. to striking block at wellhead as . . .

Flash Welds Pass Tough Test

HUGHES TOOL CO. has scored a success with its tension-impact testing device to determine strength of its new flash-weld heat-treating process.

Not a single failure occurred in a series of more than 200 tests in which full-size drill-stem specimens were subjected to impact loads of more than 400,000 ft.-lb.

The new testing device, the largest machine of its kind in the world, simulates oil-field conditions and provides high velocity impact through the gravity drop method.

This involved drilling a shallow cased well, equipped with a heavy, steel striking block at the wellhead, with sufficient strength to absorb the impact. To produce the desired shock load, the free-falling specimens are caught on the elevator shoulder of the top tool joint and stopped immediately.

Anvils of various size were designed to fit the different specimens tested. They slip into the anvil holder like slips in a rotary table. Purpose is to catch the falling drill-stem specimens.

Specimens consisted of a joint of drill pipe with tool joints flash-welded at either end. Drill collars were attached to the pipe to give the assembly the necessary weight. Fins were added to the subs to reduce wobble in the falling assembly.

For each drop, the assembly is raised 28 ft. and released by an air-operated tripping device. To prevent accidental releasing of the assembly, two air lines are used to activate the tripping device.

The specimens represented a wide variety of metallurgical conditions involved in production of flash-weld tool joints. Some included various heat treatments of welds, and others, welding in various atmospheres and with different machine cycles. Some specimens were notched in the welds before testing.

Quadruple Completion Set

MAGNOLIA Petroleum Co. now has the official blessing of the Texas Railroad Commission to produce Texas' first quadruple completion at its 8 Santa Cruz farms in San Carlos field, Hidalgo County.

The well will produce from four separate Frio gas reservoirs between 7,024 and 7,649 ft.

The three top zones produce through three 2⅞-in. tubing strings, the lower zone between the casing (7⅝-in.) annulus (OGJ, Mar. 3, p. 81). On flow tests using ¼-in. chokes in each case, the four zones totaled roughly 60,000,000 cu. ft. daily.

—— *Industry* briefs

Tennessee Gas Transmission Co. has filed a registration statement with the Securities and Exchange Commission covering 1,084,054 shares of common stock. They will be offered to holders of Middle States Petroleum Corp. stock on basis of 45 TGT shares for each 100 Middle States shares. Deal still depends on approval by at least two-thirds of Middle States holders.

Standard Oil Co. of California has a new Alaska depth record. Its wildcat on Deep Creek Unit near Ninilchik on southern Kenai Peninsula passed old mark of 12,384 ft. and is drilling ahead below 12,399 ft. Former record holder was Richfield Oil Corp.'s Swanson River discovery well 50 miles northeast.

Producing Properties, Inc., Dallas, last week bought 99 wells in California's Wilmington field for more than $10,000,000 from Continental Production Co. and E. C. Simmons, Los Angeles. Producing Properties said the transaction involved $10,000,000 in cash plus "certain other considerations." Company engineers estimate oil reserves acquired at about 17,000,000 net barrels over and above royalty oil.

The properties, underlying the city of Long Beach, currently produce 2,500 bbl. daily. A portion of the production now is being water flooded in an operation directed by Phillips Petroleum Co. Producing Properties says it intends to spend $2,500,000 immediately to expand the flood.

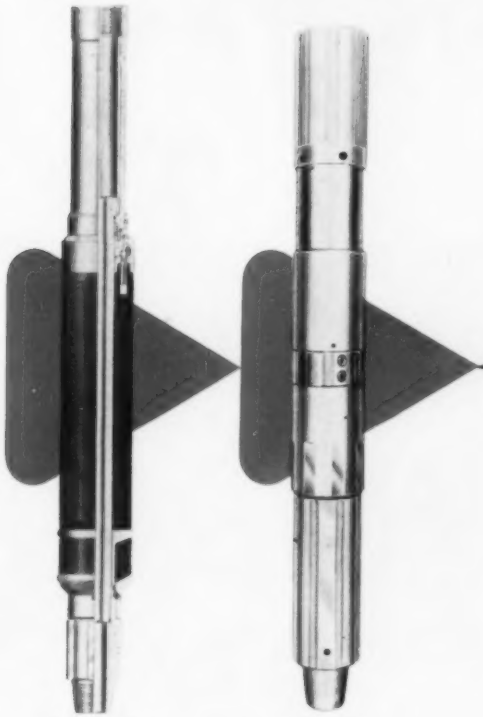
Royalties and rentals on Alaskan oil leases are expected to go up before the end of this session of Congress.

The Senate interior committee is expected to take quick action on a bill to hike the royalty rate from 5 to 12.5% and raise rentals from 25 to 50 cents an acre.

The bill also would permit the issuance of oil and gas leases on inland navigable waters in Alaska.

The Texas Board of Insurance last week cut workmen's compensation insurance rates for offshore drilling operations but sharply increased the rates for other over-water drilling. The new rates will take effect July 1.

Compensation-insurance rates for offshore work presently are 70% higher than those for inland drilling. The new rule cuts this to 60%. The new rate also applies to operations in "protected waters," such as bays and lagoons, which previously were free of any loading factor.



Expanding Shoe Wall Packer Assembly

Hydro-Spring Tester

UNBEATABLE FORMATION TESTING COMBINATION

HALLIBURTON'S

EXPANDING SHOE WALL PACKER ASSEMBLY and HYDRO-SPRING TESTER

Developed by the world's foremost formation testing organization, the Expanding Shoe Wall Packer Assembly and the Hydro-Spring Tester add a plus advantage to your testing string. The result: better reservoir evaluation... more information from your well!

THE EXPANDING SHOE PACKER:

- Minimizes hole drag through use of smaller packer.
- Easier packer release... Pulling or jarring minimized.
- Fewer mis-runs.
- More dependability, especially in oversize holes.
- Less rubber left in hole.

THE HYDRO-SPRING TESTER

A combination tester and locked open by-pass operated by vertical movement of the drill pipe, also substantially increases the effectiveness of formation testing operations.

THE BY-PASS:

- Aids in the easy, rapid descent of the string and in the elimination of formation and packer damage.
- Aids the packer in squeezing through tight filter cake deposits and helps prevent pressure build-up below the packer that could cause possible loss of circulation.
- Helps prevent the forcing of mud into the formation.

Put the multiple benefits of the Halliburton Expanding Shoe Wall Packer Assembly and the Halliburton Hydro-Spring Tester in your well. For well "know-how" that can help you know your well better, call your Halliburton Tester today!

HALLIBURTON

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Duncan, Oklahoma

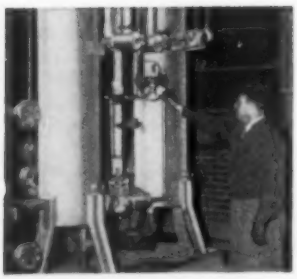
TESTING SERVICE

31 years and 4 months ago John F. O'Donohoe specified and bought Halliburton Testing Service. Today — he still remains a friend of Halliburton. Says O'Donohoe, "I believe that I get just as much satisfaction today from specifying Halliburton services and products as I did at the completion of their first drill stem test for me almost 32 years ago. It's pretty hard to beat the combination of advantages you get from a company whose policy over the years has been to provide the 'better than average' in oil well services and products."

Some of the many available desiccants

It takes an expert prescription to dry gas properly . . .

Come to Kemp



Kemp Model 300 S Dryer protects pneumatically operated instruments at Sun Oil's Marcus Hook Plant. This unit has operated continuously since installation with little or no attention, giving specified performance at all times.

Over 20 *different* desiccants . . . each with its own particular properties and uses. It takes experience to choose the right one and engineer it into a drying system that will exactly meet your needs.

Kemp offers you that experience . . . almost a quarter-century in designing and building drying apparatus. Kemp engineers combine the right equipment and the right desiccant into a unit that brings you dependability, ease of maintenance, and simplicity of operation. For any use . . . guarding pneumatically operated instruments and tools . . . drying process gasses and inerts for blanketing and purging . . . pressurizing anhydrous liquids . . . liquid drying or any of a host of other applications . . . a Kemp Oriad or Convection type dryer will give you high efficiency drying at low cost.

To improve performance and cut costs in your operation, have Kemp engineers recommend a system for your plant. Your Kemp Representative will give you detailed information, or write direct for Bulletin D-100. The C. M. Kemp Mfg. Co., 405 East Oliver St., Baltimore 2, Md.

Kemp Convection Dryers

Kemp Inert Gas Generators

KEMP OF BALTIMORE

Kemp Industrial Carburetors

Kemp Oriad Dryers

Pipelining Is Getting the Plush Treatment

CREWS are laying plastic pipe in Texas from a bus—no more eating right-of-way dust or being exposed to the elements.

The assembly-line method has been used successfully by Hemphill Contracting Co., Lubbock, Tex.

The technique, pictured above, was used to lay 2, 3, and 4-in. pipe from Southwestern Plastic Pipe Co. in a salt-water disposal system in Lee Harrison-Clear Fork field in Texas. The system works like this: Seats are removed from a bus. Pipe racks are installed. The joints of pipe are made up inside the bus and are fed through a hole cut in the rear of the vehicle.

As joints are added, the bus moves forward, laying pipe on the ground along side of the ditch. The method may be applicable to larger projects.

PIPELINE BRIEFS . . .

Wabash Pipe Line Co. has been formed by Ohio Oil Co. and Continental Oil Co. to build and own a 350-mile, 12-in. products system in Illinois and Indiana. Ohio, with 75% stock interest, will operate the system which will have ultimate capacity of 90,000 to 100,000 bbl. daily (OGJ, Nov. 26, 1956, p. 49).

The system includes 85 miles of line already built from Ohio's refinery at Robinson, Ill., to Champaign, Ill. A 265-mile line under construction from Wood River, Ill., to East Chicago, Ind., will be completed this year. It will connect with the Robinson line at Champaign.

Buckeye Pipe Line Co. has awarded a contract to build its 50-mile, 10-in. products line from Syracuse to Utica, N. Y., to Sheehan Pipe Line Construction Co., Tulsa. Work is under way. The project is due for completion in September.

Interstate Oil Pipe Line Co. has sold its Arkansas properties to Service Pipe Line Co. and Lion Oil Co., a division of Monsanto Chemical Co. The sale involves 115 miles of crude line and 125 miles of gathering lines. Lion operates a 28,000-bbl. refinery at El Dorado, and American Oil Co., a Service affiliate, has a 38,400-bbl. plant in the same city.

The reduced demand for Canadian crude and products continues to be reflected in lower pipeline deliveries, down 7.3% in March from the same month a year ago. Deliveries averaged 775,561 bbl. daily against 836,782 bbl. daily for March of 1957. For the first quarter ending in March, total deliveries from gathering and trunk lines were off 6.4% from 77,000,621 bbl. to 72,050,645 bbl.

Texas Eastern Transmission Corp.'s Little Inch division has posted a tariff, effective June 16, of 56 cents per barrel for shipping LPG from Baytown, Tex., to Todhunter, Ohio. The tariff from Beaumont to Todhunter, on the 20-in. line recently converted from natural-gas service, is 54 cents.

Also for Pipeliners . . .

IN THE NEWS: Denver mayor refuses Colorado Interstate rebate offer and stymies effort to settle multimillion dollar rate dispute (p.67). . . Michigan Wisconsin Pipe Line gets FPC approval for expansion project in Oklahoma's Laverne area (p.70). . . Double action clears way to financing Texas-to-Florida gas line: Corporate reorganization puts project under one company, and U.S. Supreme Court denies objections to project from Florida fuel-oil distributors (p.77). . . Pipeliners have a soft job laying plastic pipe from rear of a bus. Same idea also may be applicable to bigger lines (p.81). . . Creole nears completion on 92-mile, 30-in. line from Temblador to Caripito in eastern Venezuela (p.87). . . Latest pipe-pulling techniques used in Mobil Oil's new offshore unloading line at Accra on West Coast of Africa (p.88).

PLUS THESE TECHNICAL REPORTS: It costs 2½ times more to lay an offshore line than one in the Mid-Continent (p.108). . . Pipeline construction report (p.135).

SMOKE billows from Iran's Ahwaz 6, before it was snuffed out. Part of the fire-fighting equipment is in the foreground.

AMERICAN fire-fighter Myron Kinley, left, inspects work at the site with the fire master (in uniform) of Abadan refinery.

Iran's Wild Well Is Finally Quelled

A STUBBORN blazing oil well finally bowed to Myron Kinley in Iran last week after the Houston fire-fighter had battled the blaze for more than 40 days.

Kinley's fifth try at blowing out the flame with explosives was successful on June 4.

Then he and his crew started the ticklish job of capping the well and shutting off the high pressure flow of gas, condensate, and crude.

The well has spouted an estimated 100 million cubic feet of gas a day since it blew out April 19. Three weeks later the well began to flow crude. No estimate of this flow has been made. Press reports from Teheran last week estimated the well has burned $1 million worth of oil and gas a day since it blew out.

The troublesome fire took the efforts of Kinley's entire organization —three men—plus a crew of 460 Iranians and engineering personnel of the international consortium.

Kinley flew to Iran April 23 and after a quick look at the burning well sent for Boots Hansen, one of his assistants. Last week, after his fourth shot of explosives failed to snuff the fire, he sent for Red Adair, his other assistant.

Efforts to blow out the 250-ft. plume of flame were hampered because the fire-fighters were setting off their shots 10 ft. above the well fittings. The 13⅜-in. casing flange and one Cameron blowout preventer were found to be intact after Kinley succeeded in clearing away the rig wreckage May 18. The "high" shots were fired to try to put out the fire without damaging these wellhead fittings.

A second valve, already tested, was attached to a 50-ton crane and all ready to be lowered over the jet of escaping gas and oil the moment the fire was put out.

The well blew out and caught fire during a coring operation at 8,093 ft. It was the sixth well drilled in the last 30 years on the Qarait structure at Ahwaz. All the previous wells were thwarted by mechanical troubles in the hole (OGJ, April 28, p. 78; May 19, p. 115; and May 23, p. 72).

Old mark broken . . . Before yielding to Kinley's fire-fighting tactics, Ahwaz 6 set a new record for burning wells.

The wild well far surpassed the 26-day record set nearly 8 years ago by a blowout at Naft Safid, about 40 miles northeast of Ahwaz 6.

The blowout at Naft Safid of Anglo-Iranian's now-famous Rig 20 was snuffed out by Kinley with a blast of 500 lb. of gelignite. Films made of that operation have become a classic movie on how to put out an oil-well fire.

That was the first of three blowouts in Iran since 1951 which have rated Kinley's attention. Kinley also was called when National Iranian Oil Co.'s Alborz 5 blew out and spewed an estimated 80,000 to 150,000 bbl. of oil over the countryside near Qum for weeks. The well never caught fire.

North Sumatra Ships Oil

THE FIRST OIL exported from North Sumatra in more than 15 years was shipped last week from Pangkalan Susu by the newly formed Indonesian National Oil Wells, Ltd., a government company.

Press reports from Indonesia said the 15,000 bbl. of crude left the terminal in a Japanese tanker. Its destination was not immediately disclosed.

Officials of Edgington Oil Refineries, Inc., Long Beach, Calif., said they have no knowledge of the crude shipment. Edgington signed a contract early this year in which he agreed to finance rehabilitation of the fields and take the production for the next 2 years (OGJ, Jan. 6, p. 84, Jan. 27, p. 104, and Feb. 10, p. 84).

The Japanese have tried for years to dicker with the Indonesians to buy the North Sumatra production with Japanese currency. The producing fields once belonged to Royal Dutch Shell Group, but were never returned after World War 11.

We're Guided By Service As Well As Performance

IN STANDARDIZING ON GASO PUMPS

Let's face it. It isn't pumps but *pumping service* that we buy when we place a pump order; and it's service that sold us on Gaso Pumps. Service that starts with intelligent recommendations by nearby distributors. Service that continues through years of dependable performance. And service that extends, in many cases, a quarter-century beyond the purchase date, with the immediate delivery of parts for long-obsolete standard models. Because of such service, Gaso became a habit with us...a habit we made official by specifying Gaso Pumps whenever the requirements fall within their capacity range.

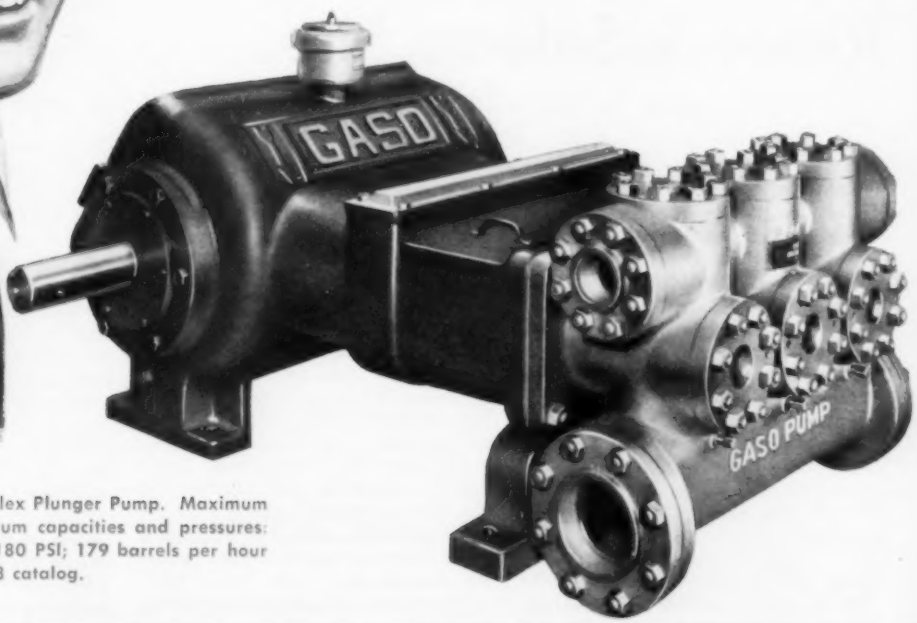


Fig. 3466 Horizontal Triplex Plunger Pump. Maximum speed, 250 RPM. Maximum capacities and pressures: 91 barrels per hour at 1180 PSI; 179 barrels per hour at 600 PSI. Write for 1958 catalog.

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GASO PUMPS
for every oil industry need

Rimrock Selects Site

. . . in Paraguay for first wildcat on IPC concessions. It is near Bolivia's Camiri field. Rig will be air-lifted.

RIMROCK International Co., a newly formed subsidiary of Rimrock Tidelands, Inc., Shreveport, has completed geological work in Paraguay and has spotted location for its first test well.

Rimco is acting as operator and drilling contractor in exploration of 7,500,000 acres of concessions in Paraguay held jointly with International Products Corp.

The company says it will drill the first wildcat in the northwestern corner of its Zone 3. This is a long narrow concession block of about 1,500,000 acres in northwestern Paraguay running along the Bolivian border (see map).

It is only a few miles across the Bolivian border from the projected wildcat to nearest production at Camiri field. Camiri is the northernmost of a north-south string of Bolivian and Argentine oil fields which roughly parallel Paraguay's western border.

Rimco currently is preparing to ship a rig from Louisiana to do the drilling. Drilling equipment and other supplies will be landed at Puerto Casado, then air-lifted by C-82 cargo carrier to an air strip at the drilling site.

This is a change in signals from original plans (OGJ, Feb. 3, p. 71) which called for moving the rig via the Parana and Paraguay rivers at least as far as Asuncion, then using rail and road transportation to the drill site.

A Rimco source told the Journal last week that it likely would be 4 to 6 months before the wildcat could be spudded due to the logistical problems. For instance, air strips must be built both at Puerto Casado and at the well site.

The delay now will dictate speed once the operation gets under way in that Rimco and International Products reportedly have only about 7 months left in which to drill two holes or lose the concessions.

The Rimco announcement spotting first drilling location appeared to have spiked, however, previous reports that the deal with International Products had soured.

The new company . . . Rimco, the new Rimrock Tidelands subsidiary, is headed by W. O. White as president and a director, and H. L. Rowley, board chairman.

White resigned as vice president of Rimrock Tidelands to take the new job. He will headquarter in New York with Rimco's executive and foreign exploration offices. General offices of the firm will be in Shreveport. And branch offices will be maintained in Zurich, Switzerland, and Palermo, Sicily.

Other company officers include: Joseph L. Hargrove, vice president and coordinator of foreign operations, and Geo. S. Buchanan, vice president in charge of exploration.

Directors, along with White and Rowley are: Buchanan; Dr. Paul Gmur; William G. Helis, Jr., New Orleans, independent; Glenn E. Nielson, president of Husky Oil Co.; Justin R. Quarbes, Jr., Shreveport insurance executive; and Harrie Shea, partner in Bear, Stearnes & Co., New York investment bankers.

Other irons in fire . . . Rimco has acquired or agreed to acquire (directly or through subsidiaries) concessions and applications for concessions on a net 8,655,715 acres in France, Switzerland, Paraguay, Sicily, Tunisia, and Turkey. This includes the net 3,750,000 acres in Paraguay.

The company plans to drill a wildcat this year, too, in the Aquitaine basin in France where it has a one-third interest in 500,000 acres acquired in its recent purchase of Mofag Oil Exploration Co., Inc. (OGJ, Jan. 27, p. 144). Mofag also owned Swiss concessions.

The French well will be drilled in the Mareuil-Sariat area near the town of La Tour Blanche about 85 miles northeast of Bordeaux.

A Rimco rig now in the "Mediterranean region" will be moved in to drill this test.

Turkish deal . . . In another recent deal, Rimco entered into an agreement to acquire all the stock of Marmara Petroleum Corp., which holds four concessions totaling more than 450,000 acres in Turkey.

This deal is subject to approval of the stockholders of Husky Oil Co., Marmara's parent firm.

This is expected as a matter of course in that Husky also holds controlling interest (54%) in Rimrock Tidelands, Rimco's parent firm. Husky got this interest through a merger last year between Rimrock and Trans-Tex Drilling Co., another Husky subsidiary.

Sicily and Tunisia . . . A Rimco subsidiary, Soc. Oli Minerali, a Sicilian corporation, has a 46,000-acre concession along the northern coast of Sicily.

This firm also has applied for exploration permits on substantial areas in Tunisia.

A contractor, too . . . Rimco, along with its exploration interests, plans to

do world-wide contract drilling, too.

It now has four drilling rigs in the Gulf Coast area (one of them headed for Paraguay), plus the one in the Mediterranean area.

The company is aiming primarily at earning interests in still more foreign concessions by negotiating drilling deals with other firms.

Company properties in addition to concessions and rigs include interests in gas production in South Louisiana.

Pan Am Gets Ready

to explore Persian Gulf under Iranian agreement.

PAN AMERICAN Petroleum Corp. isn't wasting any time since approval of its 50-50 partnership agreement with National Iranian Oil Co. (OGJ, May 5, p. 84).

Pan American already is sending some key personnel from its Tulsa headquarters to New York for duty with its wholly-owned subsidiary, Pan American International Oil Co.

Under the agreement, Pan American will start exploration surveys within 6 months and will start drilling at least one well within 18 months on the 4 million-acre offshore area in the northern part of the Persian Gulf.

To get the concession, Pan American will pay the Iranian government a cash bonus of $25 million, in addition to forming the 50-50 partnership with NIOC.

The two companies will form and jointly finance a nonprofit joint-stock company, to be known as IPAC (Iran Pan American Oil Co.). The chairman of IPAC will be an NIOC nominee. The vice chairman and the managing director will be Pan American nominees.

Pan American agreed to spend $34 million on exploration the first 4 years, and an additional $6 million per year during the next 8 years—a total of $82 million.

Development and operational expenses will be shared equally by the two companies. The exploitation period is 25 years from the date of commercial production, with provisions for three 5-year extensions.

Both Pan American and NIOC will pay income taxes to the Iranian government equivalent to 50% of their net profits.

Rentals also will be treated as a credit against Iranian taxes. No rental will be paid the first 12 years. Thereafter, rentals will be paid on a graduated scale, ranging from about $1.60 per acre in the thirteenth year up to about $2.50 per acre after the twenty-fourth year.

Chinese Are Banking on Karamai Field

CLOSELY-SPACED rigs lined up in Karamai field will be work-horses in Red China's new 5-year plan. (photo).

The Chinese say the field is the largest in the country. Despite its location in the remote corner where China, Russia, and Mongolia meet, Karamai is taking priority over present production at Yumen and Tsaidam, and over a boom in a new discovery area at Szechwan (OGJ, May 26, p. 75).

Red planners are counting on 3-million tons, about 60,000 bbl. daily, from Karamai in 1962. This will be half of the country's target for crude and shale oil production. An oil town of 30,000 people has sprung up around the field, and the first pipeline, with 8,000 bbl. daily capacity, is under construction.

This year's goal for crude and shale oil output is 1,660,000 tons, or about 33,200 bbl. daily. This is a gain of 7% over last year. Crude oil will account for 56% of the total, or about 18,600 bbl. daily.

Shale oil development will also continue. Numerous shale deposits near consumption centers make small and medium-sized plants practical.

Aramco Scores on Stepout

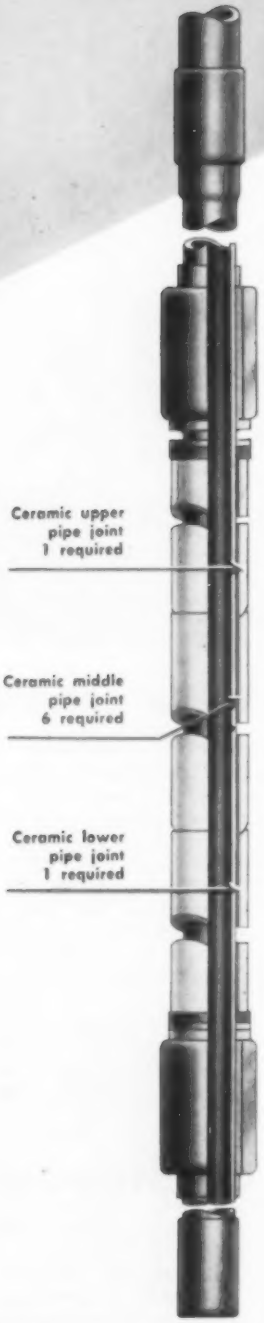
ARABIAN American Oil Co. has completed a 4-mile stepout to its newest oil discovery and has started a third well in Saudi Arabia's interior field.

Khurais 2 was completed as a producer in the "D" member of the Arab zone. Aramco said the well's potential has still not been fully tested. The well was plugged back to 5,654 feet from its total depth of 7,338. This would indicate it is downdip from the discovery well.

Khurais 1, 75 miles inland from the nearest Aramco field, tested from 3,000 to 4,000 bbl. daily of 33° gravity sour crude (OGJ, March 10, p. 102). The discovery well was taken to 10,621 ft. before it was plugged back to the "D" member of Arab zone at 4,975 ft. The second well is 4 miles southwest of the discovery.

The rig was skidded last week to the location for Khurais 3, at a site 5½ miles southeast of the discovery well.

The initial Khurais well was spudded last August on a structure outlined by Aramco during a gravity meter and core drilling program. The new field is in the Dahana, a shifting belt of sand dunes east of Saudi Arabia's central plateau. The new field is 90 miles northeast of Riyadh.



for dual completion wells use

HIGH STRENGTH CERAMIC

Tubing Protectors

CERAMIC ENGINEERS, INC. of Houston, Texas, after several years of research, are now able to furnish HIGH STRENGTH ALUMINA CERAMIC protectors that have proven successful for use on tubing that is subjected to highly erosive conditions of the upper producing zone in dual completion wells.

Due to the hardness, mechanical strength, and its ability to resist extreme erosion and corrosion, COORS HIGH STRENGTH CERAMIC will outlast and eventually replace the conventional methods now commonly used.

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HEAVY CRUDE en route to Caripito will cross this river as . . .

Creole Line Nears Completion

LOW-GRAVITY crude will soon be moving from southern Monagas through a new 92-mile line from Temblador to Caripito in eastern Venezuela.

Because of the viscosity of crude from Jobo and Pilon fields, the 30-in. line will have capacity of only 48,000 bbl. daily. This is roughly one-tenth the volume of high-gravity crude which can be put through a line of that size.

The new line, which is nearing completion, is part of a program by Creole Petroleum Corp. to increase the use of heavy crudes for which the world market has improved in recent years.

About 40,000 bbl. daily will be supplied from Pilon and Jobo, where production averages 12.5° gravity and viscosity of 32,000 S.s.U. at 85° pumping temperature. Some Jobo wells have viscosity as high as 100,000 S.s.U.

The other 8,000 bbl. daily will be medium crude from Temblador which is 22.7° gravity with viscosity of 440 S.s.U. This crude will continue to be exported. The Pilon-Jobo mixture will be processed at Creole's Caripito refinery.

Pilon was discovered 20 years ago, some time before Jobo, but development wasn't started until 1952, stimulated by stronger demand for derivatives of heavy crude, particularly heavy fuel oil. Improved realization from formerly unwanted crudes led to the drilling of 63 producing wells in the two fields which produce from 3,400 to 4,400 ft.

Automation feature . . . The pipeline boasts the first remote-controlled, unattended mainline pump station in South America.

The incentive for automation was particularly attractive on this $13-million project because of the special need to cut transportation costs to partially offset the high investment per barrel of throughput.

The one booster station was designed for remote, unattended operation. The five gathering stations in Pilon and Jobo will be remotely operated as well.

There was no incentive to make extra investment to automate the Temblador originating station. A plant to dehydrate wet crude is planned in the area and it can be operated by the station operators.

The power line which supplies the stations will also be the carrier for supervisory and metering channels to operate and monitor the unattended station at the midpoint of the line.

Pumping equipment . . . Screw pumps were chosen for their ability to handle the special job of pumping viscous crudes.

Both the initial station and its satellite will have four of the pumps, including one on standby, driven by 500-hp. electric motors. The pumps will be operated in parallel. Although the rated capacity of the line is 48,000 bbl. per day, pumping capacity was provided for operation in excess of this rate.

The line will be operated above the design level during the day and below that level at night when the temperature drops and viscosity of the crude increases.

Screw pumps will be used at gathering stations also.

The best means of pumping this type of crude, a problem with which engineers have been struggling for half a century, was investigated thoroughly on this project. Heating or mixture with water or some product such as natural gasoline or naphtha was ruled out in favor of the extra-large pipe diameter. This method is considered good especially when there is no danger of the crude solidifying and plugging the line in the event of a shutdown.

Construction . . . Oklahoma Pipe Line Constructors, Dallas, had the turn-key contract in joint venture with Pipe Line Engineering Co., Dallas, which handled the design.

Mainline construction was started January 4, with one spread averaging 6,500 ft. per day until completion. Station construction will be completed in about 2 months.

The line was laid aboveground, which is normal in Venezuela, except for 7 miles through small towns, under roads, fences, and in some congested areas. In these spots pipe was coated and wrapped and buried in the conventional manner. Through lowlands, where water stands in rainy season, pipe was placed on 8-in. piling and in open country it rests on concrete blocks.

River crossings were installed overhead on 14-in. piling. There were nine major river crossings constructed in this manner, which proved to be satisfactory and very economical.

American personnel were used for all welding and most highly skilled jobs, but many Venezuelans served as tractor drivers, truck drivers, semi-skilled laborers, and laborers.

Line Laid With Latest Methods

SOME OF the latest pipe-pulling techniques got a workout when Mobil Oil Ghana, Ltd., laid a new offshore unloading line at its Accra tank farm on the West Coast of Africa.

The 2-mile, 10-in. products line replaced a 4-year-old, 12-in. line that was ruined by unusual corrosion conditions. The pull took 4 days because of bad weather, but the actual time spent in launching was short.

Collins Construction Co. of Port Lavaca, Tex., pulled both the now-abandoned line and the new one. One of the chief differences this time was the use of a winch fixed to an anchored barge, rather than a tow by tug. The line was pulled in eight 1,400-ft. sections, one at a time. This overcame a lack of elbow room on shore, and gave greater control in the face of cross-currents and ocean swells.

Here's how the pipe is handled on shore:

...**The first section** launched is lined up on dollies (photo). Additional sections are shown parallel to the dollies on launching racks in the background.

...**A sideboom tractor** is used to cradle the next section of pipe onto the launching dollies. The sideboom picks up the end of a section fronf the racks and nestles it into the end dolly. It then moves forward easily whipping the 1,400-ft. section into place in 5 minutes. This avoids the need for a large crew slowly working the pipe into line.

...**A static holdback** anchors the pulled portion of the line until a field weld is made with a new section and the pulling barge repositioned. The hydroscale warns of any shifting of the pulled pipe by showing any change in tension.

...**A holdback winch** to the rear takes the strain after a new weld is made and tested. The holdback winch and the winch on the barge are coordinated to give control at both ends of the line during pulling.

Mobil Oil used ½-in. wall pipe coated with coal-tar enamel wrapped with fiberglass. The line it replaced was made of ⅜-in. wall pipe and its protection included a 1½-in.-thick coating of Gunnited concrete.

Engineers are not quite sure why the first line, laid late in 1954, deteriorated so quickly. The line corroded from the inside, pitting along the internal bottom centerline.

The corrosion possibly was caused by sea water used as a purge and as line fill between tanker discharges. The use of sea water is common practice in foreign areas where similar lines have been in service for 12 to 20 years.

To prevent possible corrosion of the new line, tankers now leave product in the line as fill instead of sea water.

BP Adding Cat Reformer

THE AUSTRALIAN refinery industry will be further upgraded when British Petroleum Co. commissions its new catalytic reformer at Kwinana in West Australia.

BP is spending $9 million for the 10,000-bbl. unit, which will produce a high grade gasoline component. The reformer will go on stream by the end of the year.

At least two other refiners are also adding special process facilities at the present time. Shell Refining (Australia) is building a 6,700-bbl. Platformer at its 10,000-bbl. Clyde refinery, and plans an 11,000-bbl. hydrodesulfurizer at its 46,000-bbl. Geelong plant. Bitumen & Oil Refineries is adding a 2,300-bbl. Platformer, a 7,000-bbl. Unifining unit and new asphalt capacity at its 15,000-bbl. Matraville plant.

Investment Curbed

in Peru by one oil company. Low product prices blamed.

INTERNATIONAL Petroleum Co. is curtailing its investment program in Peru until the long-standing problem of product prices is cleared up.

The action was reported by M. L. Haider, president, at the annual stockholders meeting.

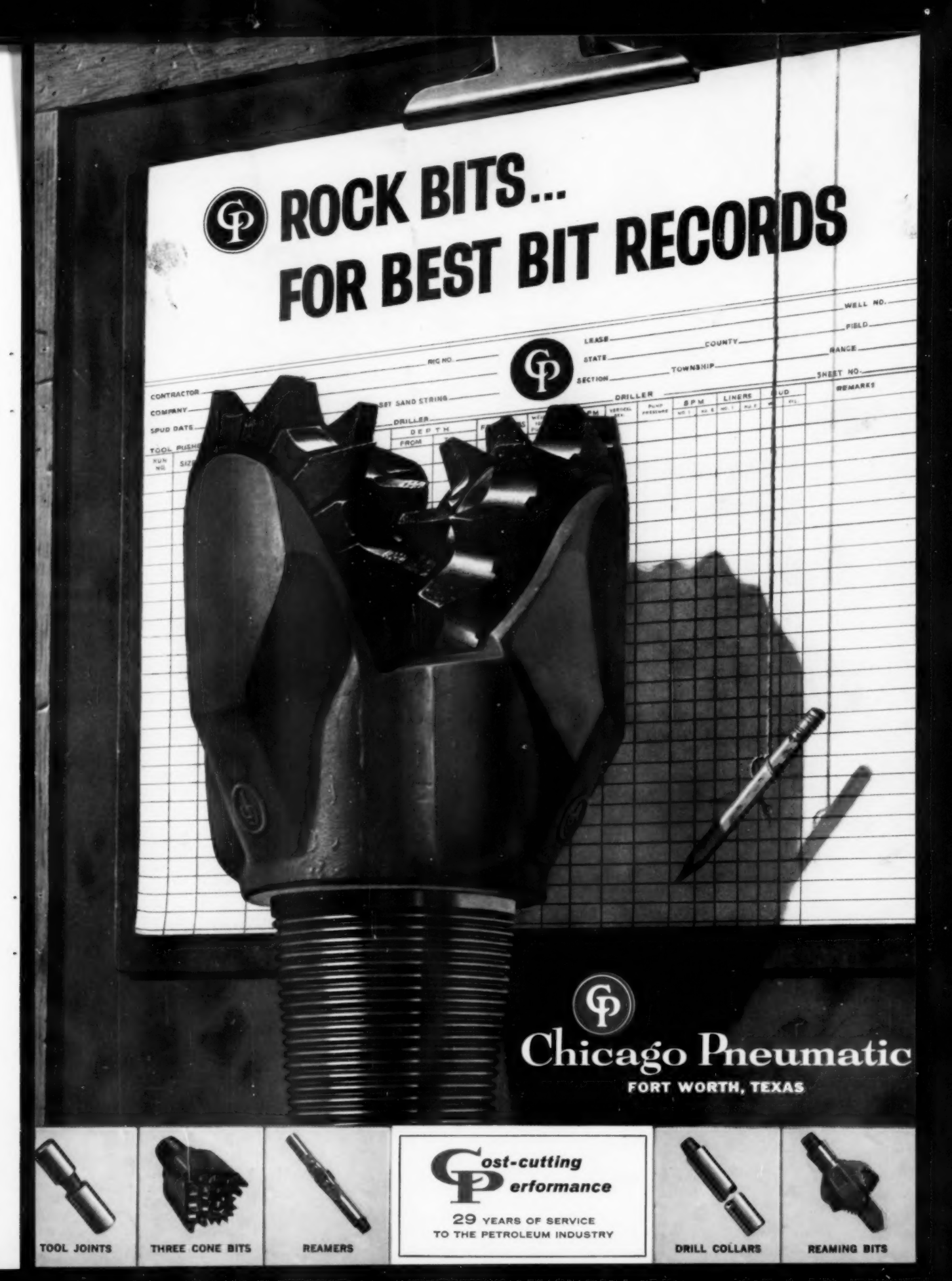
He said, "Until there is a satisfactory solution to the product-price problem, it will be necessary for the company to curtail investment programs in that country."

International Petroleum's profits dropped to $7 million the first quarter from $8 million the preceding 3 months, and $11 million the first quarter of 1957.

The company has a $40-million, 3-year expansion project in progress on a concession in which it has half interest, acquired from Cia. Petrolera Lobitos. The two companies handle more than 90% of the country's 52,000-bbl. daily crude production. International Petroleum also operates a 47,000-bbl. refinery at Talara, Peru's only major refinery.

A few months ago the company warned that development was in danger when the Peruvian congress had before it a bill that would base the price of local crude on production costs and investments by producers, rather than on world-wide markets (OGJ, Feb. 24, p. 104).

Anglo-Ecuadorian Oilfields, in which Lobitos has part interest, is having similar trouble in neighboring Ecuador. The company has suspended work on a new 7,700-bbl. refinery at La Libertad because the plant faces a loss if it opens under the present government-regulated price structure (OGJ, Apr. 21, p. 110).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OFFSHORE REPORT

Journal editors here tell you what's going on beyond the land boundaries of the United States. They report on drilling, production, pipelines, exploration, and legislation.

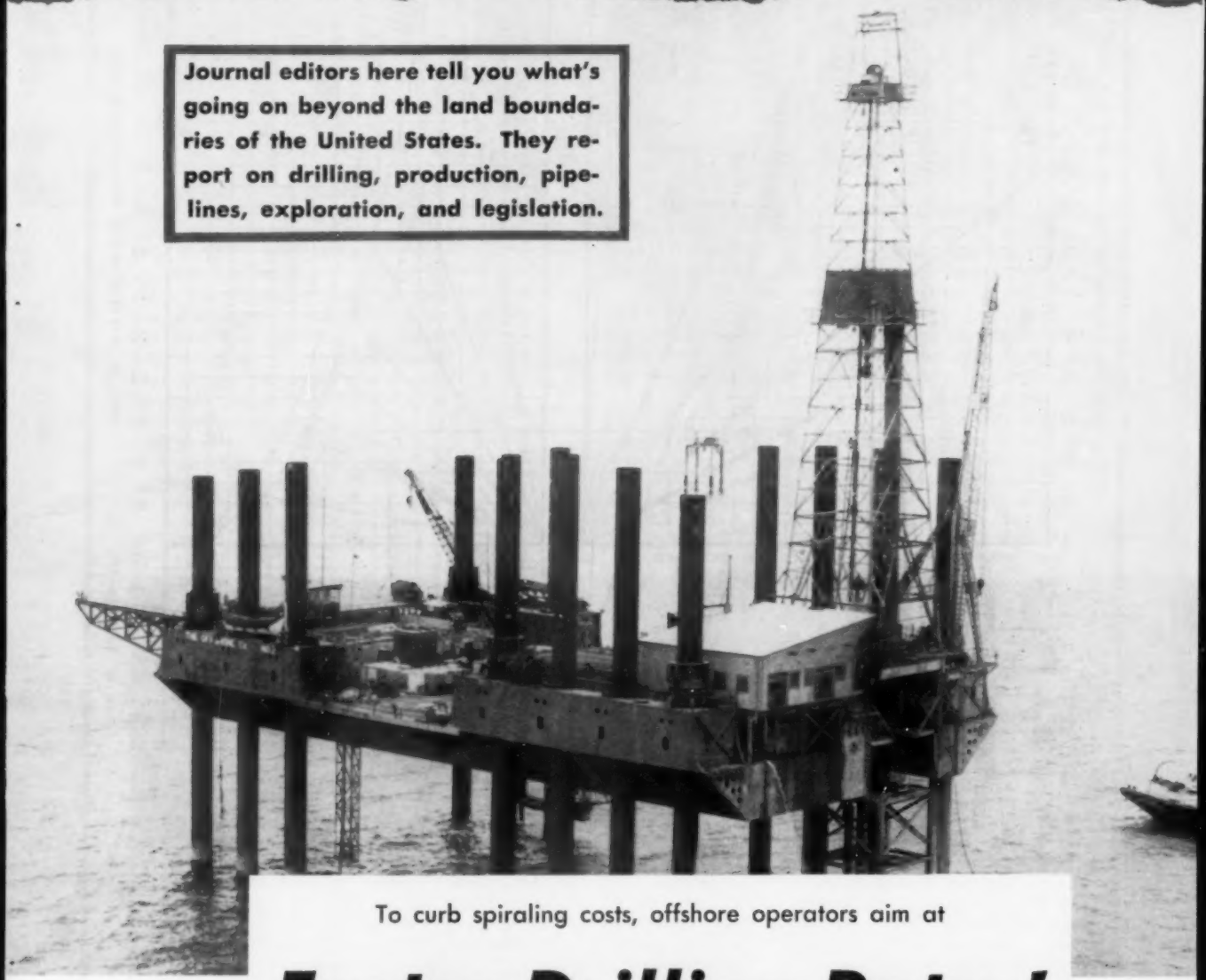


Fig. 1

To curb spiraling costs, offshore operators aim at

Faster Drilling Rates!

BY ED McGHEE
District Editor

FAST-RISING COSTS have caught Gulf of Mexico offshore drillers in a squeeze against equally fast-falling allowables. As a result these operators are searching for ways to drill wells cheaper.

Seldom have these companies been guilty of slipshod methods. Consequently, they find no single place where they are able to slice big sums from their costs. Instead, they must scrutinize each item of expense and try to trim it further.

Since rig rentals offshore are 10 times those on land, a lot of effort goes into cutting the amount of time spent on each well. Here are some ways offshore drillers aim to speed drilling and completion time:

1. Using better drilling practices that raise penetration rates.
2. Drilling more straight holes from mobile structures rather than deviated wells from fixed platforms.
3. Improving techniques of deviating directional holes.
4. Planning closer on services and supplies.

Besides these time-saving ideas, the overwater operators are shaving costs by:

1. Giving footage contracts.
2. Keeping better maintenance-ex-

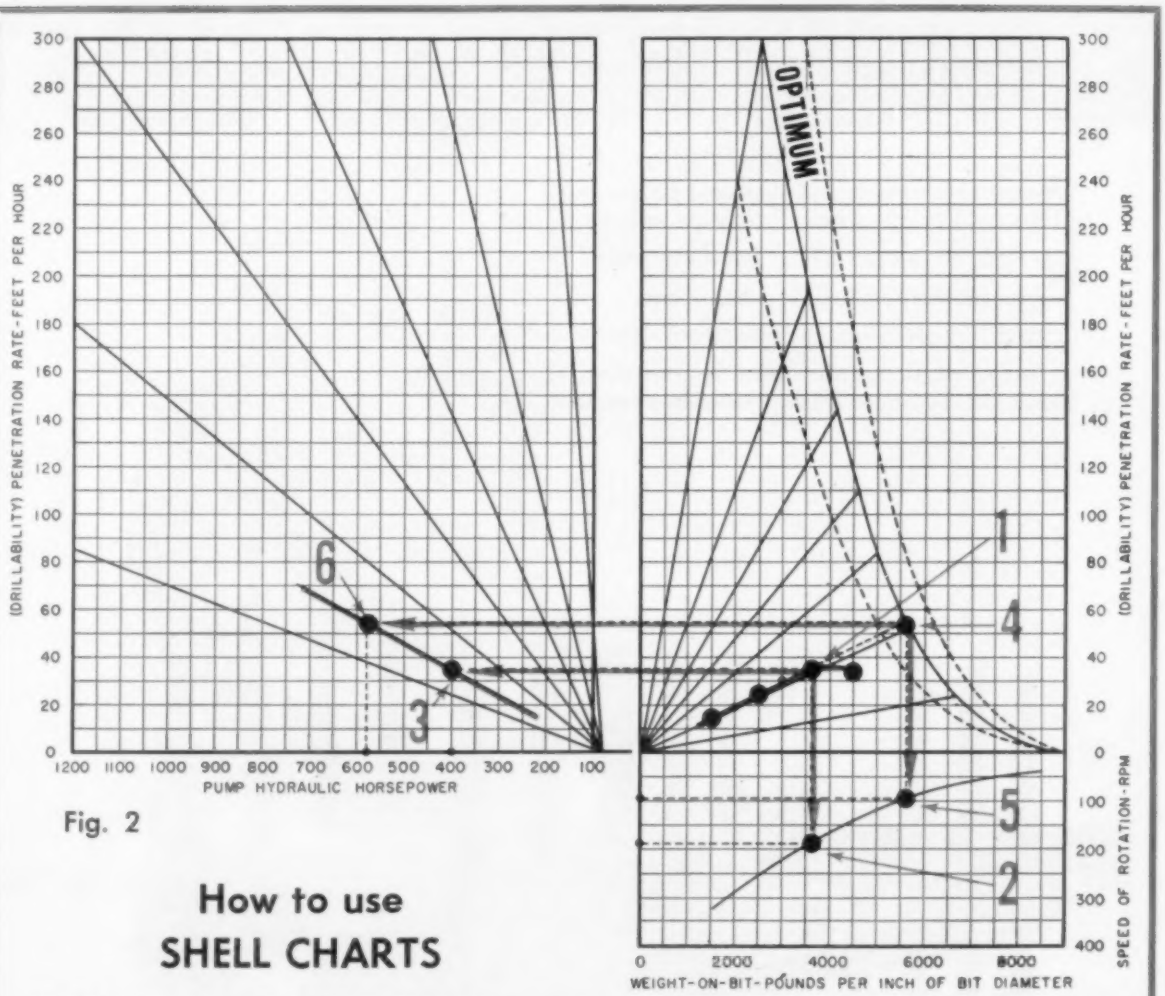


Fig. 2

How to use SHELL CHARTS

ALL YOU NEED to know beforehand is your rig's pump hydraulic horsepower. Then, you need only make this short "drillability" test and plot its results on chart.

For drillability test, keep circulation rate and rotary speed constant. Try several bit weights and note drilling rates (in feet per hour) at each. Keep raising weights until you get to and beyond ball-up point on bit. You've reached ball-up point when drilling rate starts going down instead of up when you add more weight.

Plot values of weight and drilling rate on upper-right-hand chart; notice that weight-on-bit is in pounds per inch of bit diameter. Draw a curve through points plotted; a sample curve has been plotted here.

Somewhere along your curve, drilling rate will be higher than at any other point. This is the most economical weight for the pump hydraulic horsepower you've been using. Point 1 is most economical weight in sample curve.

To find rotary speed . . . To find the most economical rotary speed for your conditions, draw a line vertically downward from the most economical weight on bit that you have just found. Where the line you draw meets the curve in the lower-right-hand chart, you will find the most economical rotary speed. Point 2 is the best rotary speed in the example.

To get optimum . . . While you have found the most economical weight and rotary for the pump hydraulic horsepower you're using, they may not be the optimum for the formation being drilled. It may be that more pump hydraulic horsepower would enable you to drill faster and cheaper. You can learn from charts.

To do this, draw a line horizontally to the left from the point you have located as most economical bit weight. Extend this line into the left-hand chart until you come to the value of your present pump hydraulic horsepower. In the example, the line is drawn from point 1 to point 3. This point in the left-hand chart fixes the relation between hydraulic horsepower and drilling rate. Draw a line from this point through the lower right-hand corner of this graph.

Then, go back to your original drillability curve. There will be a flat part on the left side of this curve. Extend this flat part in a straight line until it intersects the "optimum" weight-on-bit curve. Point 4 is the point of intersection of these two curves in the example. Then, draw a line horizontallly into the left-hand chart until it intersects the line you have just drawn through the point involving your present pump hydraulic horsepower. This gives you the value of the optimum pump hydraulic horsepower for the formation you are drilling. Point 6 is the optimum hydraulic horsepower for the problem example.

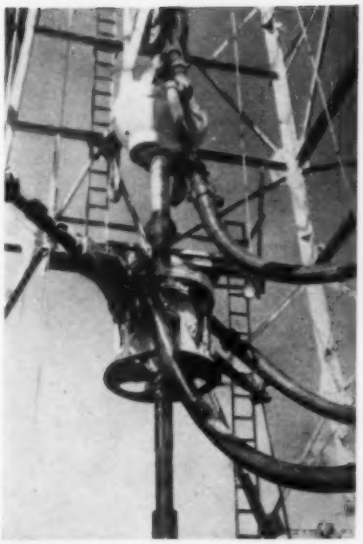
Point 4 is the optimum weight on bit to use with the optimum pump hydraulic horsepower. And, point 5, vertically below point 4, is the optimum weight on bit to go with these.

pense records and tracking down the reasons for extra high items.

3. Cutting crew size and simplifying offshore living accommodations.

Charts to make hole faster . . . Coastal Louisiana already boasts some of the fastest drilling times of any area. Very often, near the surface, the hole "washes" down almost as fast as the rig crew can make connections. Only rarely do the deeper rocks drill as slowly as in most other oil provinces. Still, much of offshore's deep-hole drilling can be, and is being, speeded up.

Shell Oil Co. engineers made a long study on how drilling is affected by weight on bit, rotary speed, and hydraulic horsepower.[1] What they found has been compiled into the chart shown in Fig. 2. Other companies have adopted this system also or have developed similar methods of their own. While this chart applies in all drilling areas, it is especially useful offshore where a little **time** saved can mean a lot of **money** saved.



POWER SWIVEL to rotate drill pipe is time, money saver. It is operated by three hydraulic motors. Fig. 3.

Shell contends that there is an optimum weight on bit, rotary speed, and hydraulic horsepower for each formation. By means of the charts, the company finds these optimum values on the rig while drilling and then changes operations to the optimum found. While a rig may not have as much as the optimum pump hydraulic horsepower, the charts can indicate the most economical weight on bit and rotary speed to use with whatever pump horsepower is available.

The method requires no special tools and can be used by rig crews. The only manipulation necessary is to make a short "drillability" test and plot results on the chart.

Results already showing . . . The emphasis on faster drilling is showing up in the bit weights and pump horsepower being used on offshore rigs. As a rule in the past, offshore drilling rigs have been "overpowered" on their pumps. That is, the pumps were capable of putting out much more pres-

KERR-McGEE Rig 47 is drilling through a small one-well platform installed immediately under the derrick floor of the mobile rig. Fig. 4.

SELF-CONTAINED platforms are taking over many jobs from the combination of floating tender and platform. Fig. 5.

sure and volume than the actual drilling practices required. The drillers were getting only 300 or 400 hp. out of the 1,000-hp. pumps many of them had.

The trouble was not that the pumps were too big for the jobs to be done. It was that the drilling practices were not good enough to take advantage of all the power built into the equipment. As a result, few rigs drilled as fast as they were capable of drilling.

This is still the situation on some rigs. However, there are now many rigs on which the contractor or operator has raised pump pressure and volumes so that they get near rated horsepower from pumps. Pressures of 2,500 psi. and above are common. Pumps rated at 1,200 to 1,500 hp. are coming into use.[2]

As the Shell charts show, it isn't enough to simply raise hydraulic horsepower. If drilling rate is to go up as it should, bit weight must also be boosted. And, the average weight on bits used offshore is going up. Where 20,000 and 25,000 lb. on an 8⅝-in. bit were common practice in the past, many offshore operators and contractors now run as much as 50,000 to 60,000 lb. on these bits. Drilling rates are higher as a result.

New tools, too . . . Some new tools are coming along to help save offshore drilling time. One example of this is the power swivel used by Gulf Oil Corp. on a rig drilling from a platform off Eugene Island, Louisiana.[3] Gulf tried using the power swivel instead of a conventional rotary to turn the drill pipe.

To Gulf, the big attraction of a power swivel is the fact that the driller can drill down 90-ft. stands with it instead of the 30-ft. singles necessary with an ordinary table. This eliminates two of three connections. The resulting time saving is especially important in the fast-drilling top hole.

Gulf also found that with the power swivel it isn't necessary to lay down the drill pipe when each well is completed. It can be left standing in the derrick, and the substructure plus the derrick with pipe standing can be skidded in one unit to the next well location on the well platform.

Only when all wells on the platform have been completed does the drill pipe have to be broken into singles and laid down. This fact can save as much as a half day of costly rig time for each well on the platform.

Another advantage of a power swivel stems from its ability to rotate the string effectively even when it is being lifted. That is, the power swivel makes it possible to "drill upwards," something that is virtually impossible with conventional rotaries. This means that the power swivel should help prevent many cases of pipe sticking in the directional holes common to offshore drilling.

Not technically a "power swivel," the Gulf tool as shown in Fig. 3 is actually a "power sub" run below a conventional swivel. It is operated by three hydraulic motors.

Gulf handled 90-ft. stands in two ways. One was to use a 90-ft.-deep mousehole that accommodates a full stand of pipe. Length of the mousehole is no problem since the derrick floor is high above the surface of the water. To make a mousehole connection, the power sub was shifted on the floor to pick up the new stand. Guy wires prevented the swivel from rotating and these had to be loosed to permit swinging over the mousehole.

The second method of handling the 90-ft. stands was to make connections in the derrick. This did not require loosening the guy wires. Although there was some difficulty stabbing into the stands in the derrick, the procedure worked out fairly well.

The power swivel is a piece of equipment that could easily pay out on most overwater jobs.

Tender Platforms, Mobile Units

Platforms cost money; the deeper the water the bigger the platform and the more it costs. From this simple fact has come a new lineup in popularity for offshore rigs. Out in front is the mobile drilling barge which can drill without a platform. Close behind it is the self-contained platform. Losing out in third place is the floating tender which serves a rig drilling from a small platform.

Offshore wildcats use mobile drilling barges almost exclusively. Since these mobile units require no platform, there is not so much loss if the well turns out to be a dry hole. If the well is completed as a producer, many companies find it cheaper to continue using the mobile unit, moving it about to define the field. The straight holes drilled by mobile

FLOATING DRILLING BARGE of CUSS group claims drilling costs comparable to onshore in numerous core-hole operations off California. Fig. 6.

units are cheaper and faster than a series of directional holes drilled from a fixed platform.

However, most offshore operators use small one-well platforms in drilling from mobile barges. Fig. 4 shows such a platform in place during drilling.

When a field is defined, the operators generally build a platform large enough to be self-contained for drilling and large enough to serve later as a production platform. This platform can be spotted so that its first well can be a low-cost straight hole. Flow lines are then run from the one-well platforms left by the mobile rigs.

There are marginal areas where the combination of floating tender and platform is economical. But very often it is cheaper to make the platform enough larger to be completely self-contained. The extra cost of a larger platform is more than offset by the rental paid for a floating tender.

As a result many of the floating tenders, formerly considered the real work horses of the offshore fleet, are now idle. Many are for sale.

Tomorrow—floating ships . . . Mobile units, platform rigs, and tenders will all lose ground if the offshore oil companies have their way. Most of the companies operating in the Gulf of Mexico are actively supporting work on techniques for drilling from floating ships. Key to success of this idea lies in finding a way to complete wells on the ocean floor.

The highly successful floating drill ship shown in Fig. 6 belongs to the CUSS group (Continental, Union, Superior, Shell). It has drilled many core holes off the coast of California, some in water as deep as 1,500 ft. The group claims that drilling costs with this ship were comparable to those onshore.

Big atraction of a floating ship is that it can operate in water of any depth and that it is stable, not tending to overturn.

Advantage of ocean-floor wells is that they need no expensive platforms. Moreover, they would not be endangered by storms nor by collision from ships.

Offshore companies are working on two general methods to service wells on the sea bottom. One method is use of a caisson which could be pumped free of water so that a man could descend to the wellhead. The other method is use of remote-control systems which allow the wellhead to be manipulated from the surface of the water. So far as is known, none of the many caission or remote-control ideas has actually been tried on an offshore well.

Fast Hole Deviation

In spite of its watery surroundings, an offshore well is drilled just like any hole onshore. One of the few original practices to come out of offshore work is a new technique for speeding the deviation of directional wells. This method uses a "big-eyed" bit to "wash" the hole off vertical instead of using a conventional whipstock. In doing so the jet method saves round-trip time required by use of a whipstock.

Fig. 7 shows the three jets from a 15-in. OSC-4J bit. Notice that one of the nozzles is much larger than the other two. Of course, the larger nozzle passes much more of the mud stream than does the combination of the other two nozzles. The big flow of mud jetting from this single nozzle tends to wash the hole out in the direction that the nozzle is pointing.

It is a simple matter to aim this big-eyed bit in the direction you want. By holding the bit stationary and washing from 10 minutes to 1 hour, it's possible to jet the hole 3° or more off vertical in soft formations. With this start in the right direction, a directional-drilling operator can begin rotating the pipe and build up even more hole angle by "crowding the bottom of the hole." He can do his drilling with the same big-eyed bit he used to kick the hole off vertical at the outset. No round trip is necessary.

Idea for the big-eyed bit technique came from personnel of The California Co. Other companies quickly

grabbed the idea when they saw how much time it can save over whipstocking. Almost all companies working off the coast of Louisiana now are experimenting with this method of deviating their wells. It appears to be most successful at depths above 6,000 ft. Some feel, however, it may finally be useful as deep as 9,000 ft.

Full-gage whipstocks . . . Help seems to be on the way for deviating holes in harder-rock areas and at depths where the big-eyed bit is not effective. This help is in the form of a full-gage whipstock. A successful full-gage whipstock could do in one trip in the hole what older whipstocking methods require as many as six trips to do.

Such tools are now under development by several major oil companies and directional-drilling firms. Some test models of the full-gage whipstock have been run in the field many times and operational models may be ready for the field later this year.

A good sea-water mud? . . . Another drilling practice original with offshore operations is use of sea water for drilling muds. In theory, sea-water muds could save a lot of money. With them it wouldn't be necessary to pay for hauling fresh water nor to sacrifice valuable platform space to store it. Till now, however, it has been hard to find the "combination" with sea-water muds; they seldom performed as well or cost as little as fresh-water muds. Besides, the salty muds sometimes made it hard to interpret electric logs. As a result, most companies resigned themselves to fresh-water muds.

Some companies in the Rocky Mountains began using gyp muds 8 years ago. Not only did these muds show a tolerance for salt water and other contaminants, they were also cheap to maintain.

The gyp muds weren't practical on the Gulf Coast until about 1 year ago when the Q-Broxin thinner was introduced. Since that time, gyp-Q-Broxin fresh-water muds have become tremendously popular. They have low gels and low viscosity even when heavily weighted. Moreover, the gyp-mud filtrate has a preserving effect on the shales drilled in coastal wells. Unlike the commonly used lime muds, the gyp mud does not thicken at high temperature.

Because of the success with fresh-water gyp muds, several companies have now tried sea-water gyp muds off the Louisiana coast. These muds appear to be almost as cheap and easy to maintain as the fresh-water gyp muds. Water loss can be kept low with a minimum of chemical treatment and interpretation of electric-logs is not especially difficult with them. For these reasons, gyp sea-water mud may become a common offshore system.

THREE JETS from 15-in. OCS-4J bit used in deviating wells without whipstock. Fig. 7.

Services and Supplies

After investigating ways to save time by improving drilling practices, many offshore operators are poking into other corners to locate chronic time losses. One such corner is that holding the practices used to get supplies and services out to water locations.

Early in the game it was common for offshore rigs to be shut down awaiting supplies or orders. Communications were bad and everyone was rushed. A badly needed repair part might be left behind on the docks. A service crew might arrive on location several hours late.

To prevent such situations, at least one major offshore operator now studies each time loss reported. If a repair part or the like doesn't arrive promptly, there is an investigation to find out why. If a piece of service-company equipment fails on the job, this operator asks for an explanation and insists that everything possible be done to prevent like breakdowns in the future.

Moreover, this company makes a beforehand "prospectus" on every well. Well depth, casing points, mud program, and the like are all set down. Then, the prospectus is passed to all contractors, tool pushers, engineers, and others concerned so that they can plan for the tools and supplies they'll need.

Mud programs and casing-string designs of previous wells are carefully reviewed. And, if possible, practice is changed to the safe minimum.

Where maintenance dollars go . . . Very often oil companies can do nothing about high maintenance and repair costs simply because they have no way of knowing exactly where the money is spent. This is true for land operations as well as marine. However, the necessity to cut costs has brought changes in this situation offshore.

Now, several offshore operators and contractors keep detailed records of where maintenance and repair dollars go. This makes it easier to expose any particular item that is costing more than it should. A special effort can then be made to bring the cost back into line.

Footage Drilling Contracts

Only recently for the first time have offshore operators been letting footage drilling contracts. Contractors are now bidding wells by the foot just as on land areas. Operators are finding that they are getting hole cheaper just as in footage-bid wells on land. Most contractors are also pleased because the footage contracts give them a chance to earn more money by drilling faster and cheaper than if closely supervised on a day-work basis.

The contracts generally require that the contractor place his equipment on the operator's location just as on land jobs. Contract prices vary according to area, running from $12 per foot to 12,500 ft. in one area to $8.50 per foot to 10,000 ft. in another.

Contractors have cut day-work rates on their rigs also. They compensate for this loss of income in several ways. First many changed their accounting system so that equipment is depreciated over as many as 8 years instead of the 4-year life most had originally figured on. Second, the contractors are cutting back on the "deluxe hotel service" that has been the standard of offshore living accommodations in the past.

Contractors are also working more efficiently. Number of men on each rig has been pared to a minimum. Because of the general slowdown in rig activity, many of today's drillers are former tool pushers. Many of today's roughnecks are former drillers. As a result, drilling efficiency is better than before.

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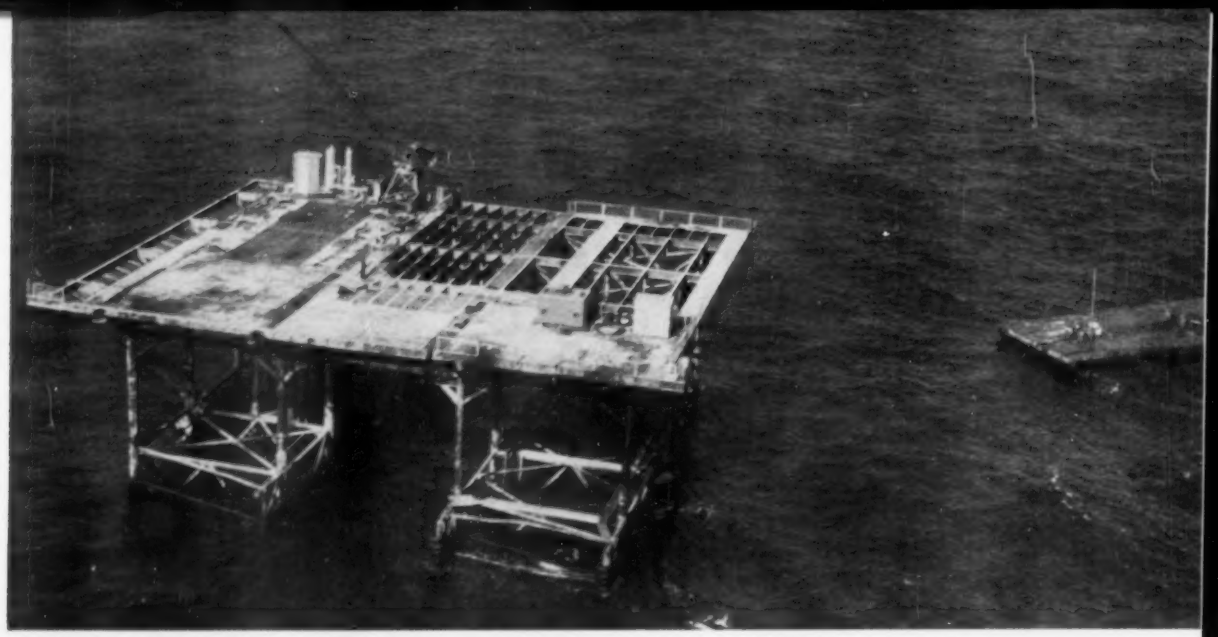


WELLS ON PLATFORM produce into the barge at right except when rough weather forces the barge to be removed and the wells to be shut in. Fig. 1.

OFFSHORE REPORT

Offshore Allowables aren't easy

to live with—but operators are trying

by ED McGHEE
District Editor

LIKE EVERYONE ELSE in the oil industry, offshore producers have been looking for ways to operate cheaper under the current low allowables. Here are some of the changes they are making to make the best of a bad situation:

1. Completing more wells dually and triply.
2. Devising new, cheaper workover techniques.
3. Applying more automation, remote control.

While these changes are helping, they don't solve the problem.

Right along, offshore wells have received allowables some 70% higher than onshore wells. And most offshore producers are reluctant to press for any greater difference to help make up for their enormous drilling and producing costs. Still, these operators long for a change in the mechanics by which these allowables are applied.

The trouble lies in the fact that the offshore wells must be produced exactly as if they were onshore. Each well is expected to make its daily allowable and no more each day. If the well gets behind, there's no way to catch up; the production lost today is lost forever. This isn't a nagging problem in land areas where there's little reason to shut in a good well.

Offshore wells get behind their allowable schedules with disgusting regularity. The reason—they're offshore. A "spell of weather" that's scarcely noticed onshore can shut down offshore operations completely. Barge movements can be delayed for dozens of reasons, forcing offshore wells to shut in as soon as platform storage is full.

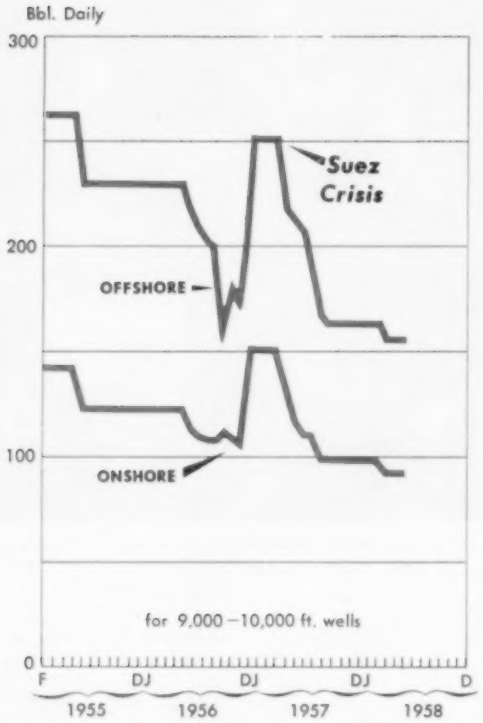
Needed—a bulk allowable . . . One answer to this problem could be a "bulk allowable" to cover a period of a month or 2 months instead of a single day. This does not mean raising the average daily allowable of the well; it simply means allowing the offshore well to make up underproduction during the bulk allowable period.

The idea has been suggested by B. Dykstra, vice president of Shell Oil Co., New Orleans. Dykstra has pointed out that offshore reservoirs would not be hurt by pulling them slightly harder during good weather and then pinching them back in bad.

If this system were used, the offshore operator could organize his production so that he could take his full 2 months' allowable when weather was favorable during that period. Then, there'd be no need to risk human life and property by mounting offshore equipment in rough seas.

With a bulk-allowable system, offshore wells would not be penalized because of their marine locations. Every barrel of oil could be produced more cheaply and safely.

Two-in-one wells . . . Gulf Coast operators have always been blessed in that many of their wells have more

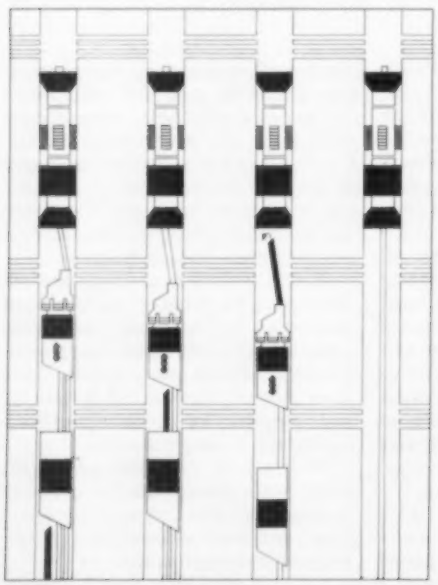


LOWER ALLOWABLES have caused reappraisal of all drilling and producing techniques and concern over the economics of offshore oil. Fig. 2.

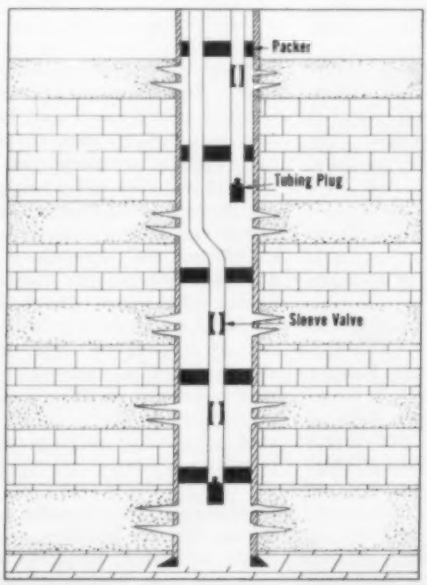
TRIPLE-COMPLETION wellhead. Offshore wells must have annulus loaded with fluid, so parallel tubing strings must be used on multiple completions. Fig. 3.

than one pay sand. While they've dragged their heels in doing so in the past, the operators can take advantage of the multiple pays to complete each well in two or more zones. Thus they can get more than one allowable for each hole and pay out drilling costs quicker. Most Gulf Coast operatores, onshore and off, are now making multiple completions where possible.

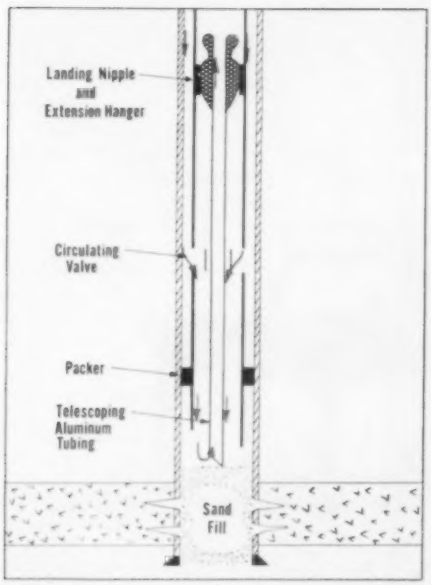
This multiple-completion, multiple-allowable situation has certainly been the salvation of many offshore operators. A dual completion costs more than a single, but it's cheaper than drilling and completing two separate wells. And a triple is far cheaper than three separate wells.



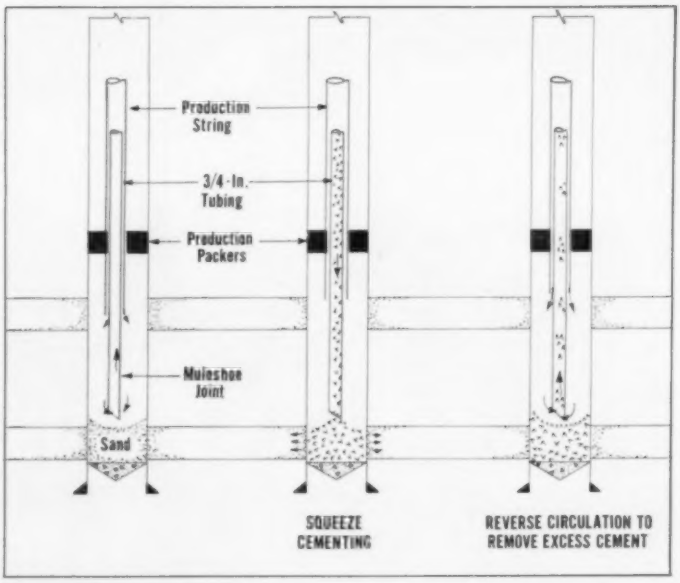
MECHANICS of running packers and tubing for triple completions. On duals there are only two tubing strings and two packers. (Taken from Reiss.) Fig. 4.



ALTERNATE multiple completion showing three sands from which long tubing string can produce and two from which shorter string can produce. Fig. 5.



PERMANENT-TYPE completion sand cleanout, requiring no pulling unit. Fig. 6.



CONCENTRIC-TUBING workover methods are shown. The ¾-in. tubing is a circulation channel to bottom. Fig. 8.

The reason more multiple completions weren't made in the past is that fishing can be a nigh-impossible task when there's more than one tubing string in the well. Also the likelihood of a fishing job goes up directly with the amount of equipment in the hole.

Offshore operators have learned many precautions they can take to reduce the odds on having to fish in a multiple completed well. A lot of the danger has been taken away by the packers and wellheads which permit tubing strings to be run independently in parallel. In times past, the straps used to fasten parallel strings together where the cause of many fishing jobs.

Most operators avoid extremely high pressures in their multiply completed wells. They plastic coat the inside of the tubing to cut down on corrosion and paraffin deposition. Many use special packer fluids (like solutions of sodium nitrate in fresh water) to eliminate the possibility of tubing and packer being stuck by gelled mud. Most operators put sleeves on the outside of each tubing string where it lies in front of a set of producing perforations; the sleeves help retard sand cutting that makes holes in the tubing.

Some go so far as to make dual completions only in wells which are high on structures. These can produce

PERMANENT-TYPE COMPLETION workover in progress on an offshore platform cuts costs sharply. Fig. 7.

CONCENTRIC-TUBING WORKOVER unit is in place on a production platform in the Bay Marchand area of South Louisiana. Over 500 ft. of sand plug was washed out of tubing below 5,000 ft. Fig. 9.

over long periods of time before the tubing needs to be pulled.

Parallel strings . . . Offshore wells are required to have their annulus loaded with fluid. For that reason, the multiple completions must be made with parallel strings of tubing. Fig. 4 shows how many of the triples are made.[1] Duals are much the same except that there are only two tubing strings and two packers.

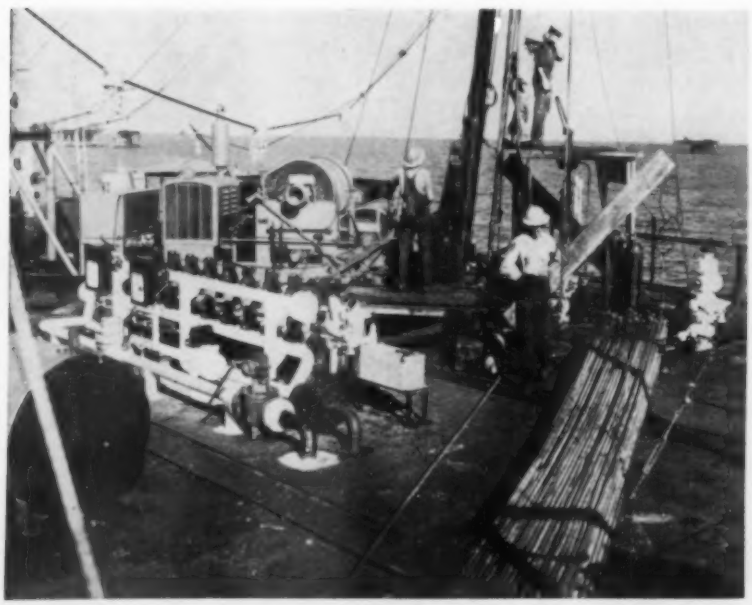
Triple completions often are being made with three strings of 2⅞-in. o.d. tubing inside 7⅝-in. casing. The duals can use two strings of the 2⅞-in. tubing inside 5½-in casing. Couplings on the tubing are turned down to decrease their diameter.

Several companies have announced their intention to make quadruple parallel-string completions when the opportunity arises.

Multiple and selective . . . One advantage always cited for multiple completions is that they make thin sands economic. And this is certainly true. Some offshore operators have recently modified a few of their multiple completions even further to "milk" the thin pays.

Fig. 5 shows a mulitple-selective completion. With this arrangement, the operator can produce more than one pay out of a tubing string without the expense of a recompletion. By using sleeve valves and tubing plugs, the operator can produce one zone to depletion and then shut it off with wire-line tools. At the same time, he can open up another of the pays.

Actually, the idea behind the selective-multiple completion is the same as that on single-tubing-string duals made in times past. Sidedoor choke nipples were commonly used in the selective duals made in many areas before parallel tubing strings became popular.



REBEL WELL SERVICE, Houma, La., crew works on a concentric-tubing job. Pipe is ¾-in. N-80 external upset pipe. Fig. 10.

Cheaper Workovers

Working over offshore wells has always been a big problem. To place a conventional workover rig on a platform means bringing out a high-rental derrick barge, several cargo barges, and several miscellaneous boats. As a result, only an extremely productive well pays out the cost of workover by conventional means.

To get around this big expense, offshore operators have been looking for new means to clean out wells, treat them, and recomplete them. The only way to do this without a conventional workover rig, of course, is to avoid pulling the production tubing. The

selective completion already described fills the bill here, but too few wells are presently set up for it. Thus two other methods had to be tried and proved.

First was the permanent-type completion (PTC). Used on land for several years, PTC methods have only recently been applied offshore to any great extent.[2] A PTC workover requires no pulling unit, but it does require that the well be equipped beforehand. That is, the tubing (and packer) must be full-opening, open-ended, and bottomed above all probable pay zones. There must be two or more landing nipples and a circulating valve in the string.

Fig. 6 is a diagram of telescoping aluminum pipe being used for a PTC sand cleanout. Fig. 7 shows a PTC operation in progress on a platform off the coast of Louisiana.

The PTC has been used in cleaning out sand, squeeze cementing and recompleting, and in sand-control operations. The cost of a workover with this method is a small fraction of the cost with a conventional workover job.

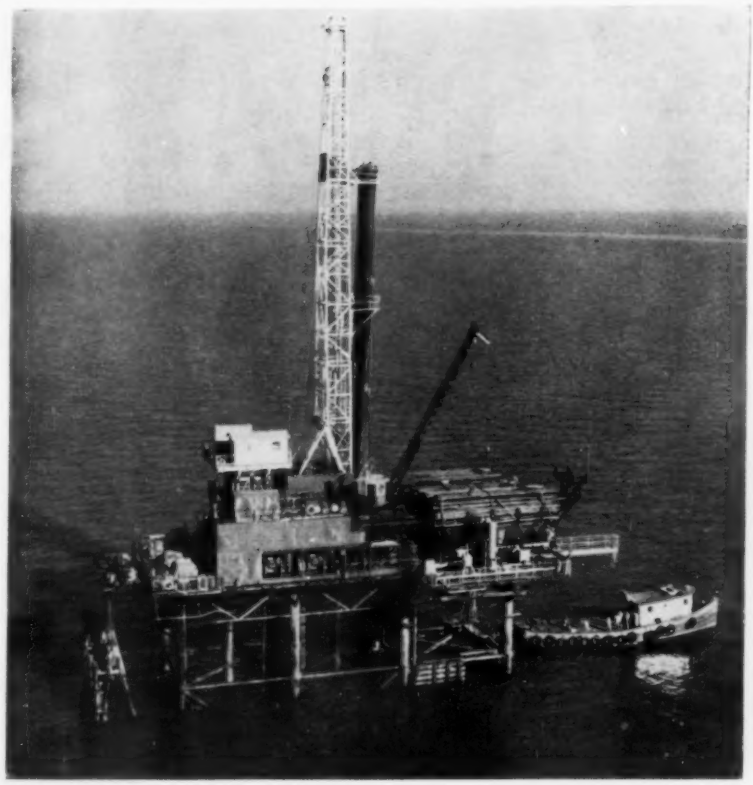
Concentric-tubing jobs . . . The second method of workover without pulling tubing is the concentric tubing method. This does require a small pulling unit, but not nearly so large a pulling unit as if it had to handle the production tubing. Concentric-tubing workovers use small-diameter pipe (mostly ¾-in o.d. to date) to run into the well inside the regular tubing. Not meant for drilling or heavy rotating, the small-diameter pipe serves mainly as a conductor to permit circulation to the bottom of the well.

Concentric tubing methods were first used to clean sand from the well bore. Results were so good that it was soon used to squeeze depleted zones in order to make recompletions in higher zones. Concentric tubing has also been used to remove set cement, acidize, sand-lock treat, and apply sand-consolidating plastics.

Fig. 8 shows some of the operations Gulf Oil Corp. and others have been performing with concentric-tubing tools.[3]

Method Very Successful

The concentric-tubing method has been very successful and has completed some cleanout jobs that PTC tools failed to do. In some cases the concentric tubing has been cheaper than PTC methods for the same job. A major difference in the two methods is that PTC work can be carried on even when there is pressure on the wellhead; all tools including the aluminum tubing can be lubricated into the well.



WORKOVER RIG is packaged to fit on eight-pile structure, operates more cheaply. Fig. 11.

This is impractical with concentric-tubing tools. As a result, the concentric-tubing workover is restricted to those wells which can be killed with salt water. Of course, after a concentric-tubing squeeze job is completed, it is possible to recomplete in a zone that would kick salt water. A through-the-tubing perforating gun can open up the zone after the small-diameter tubing has been removed and the well head "buttoned up."

Condensing rigs . . . To match the developments in PTC and concentric-tubing workovers, there has been much improvement in conventional rigs for offshore work. Fig. 11 shows a workover rig which has recently been packaged so that it fits complete onto an eight-pile platform. Rigs which require more space would have to work with part of their equipment on a barge tied to the platform. As a result, the space-saving rig shown here operates more cheaply.

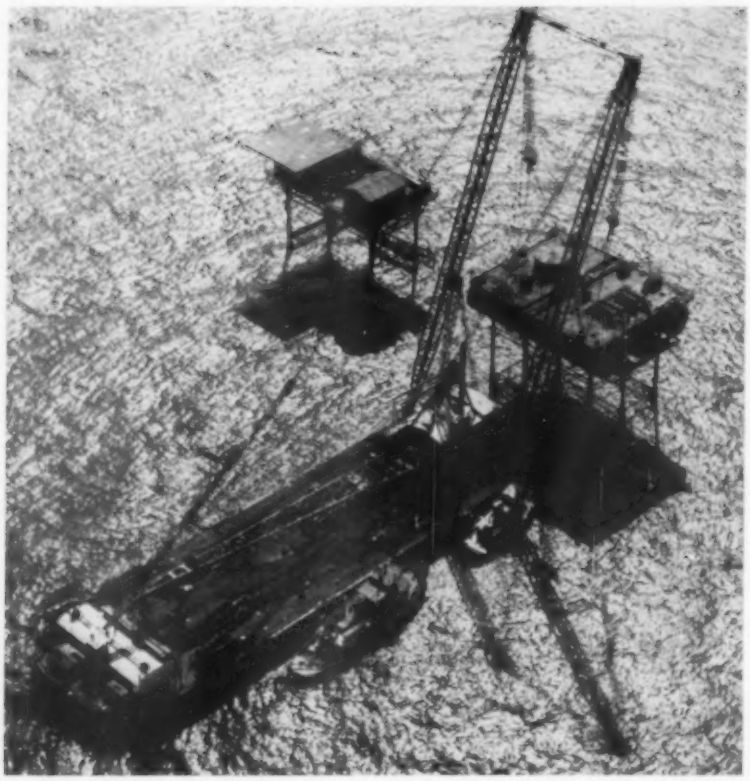
Platform Equipment

A lot of improvements are showing up in the newer production platforms. Equipment is being better packaged and requires less manpower to operate. Fig. 12 shows a platform recently installed by Phillips Petroleum Co. in the Eugene Island area off Louisiana. In the past, the tanks used on offshore platforms have been essentially the same as those for land operations. Phillips, however, has made three horizontal cylindrical tanks an integral part of the platform structure itself. This eliminates a lot of steel work and cuts cost of the platform.

Phillips has included remote control as a part of this new system. There is a control house on a second platform from which an operator can open or shut in all wells, individually or singly. He can change the producing rate of any well by switching chokes. The operator can also put wells on test and read all wellhead and header pressures without leaving his control point.

Only four wells on the single platform are connected to the system at present. But more will be added as other wells are drilled from other platforms. Phillips expects that eventually as many as 32 wells on 4 producing platforms may be connected to this single system. Electric power is generated on the first platform and will be carried by submarine cable to the later platforms.

The three horizontal crude-storage tanks hold 18,000 bbl. This should



PRODUCTION PLATFORM of new type under construction for Phillips Petroleum Co. Deck section is lifted onto platform in one piece. Fig. 12.

handle several days' production, so that the wells should not need to be shut in except for long spells of extremely bad weather. At present, barges haul the oil to shore but a pipeline may be built later on. Phillips has designed the production so that an LACT unit will pump to the pipeline automatically when it is connected.

Packaged on shore . . . Offshore companies follow the practice of packaging their production equipment on shore. When the equipment is gathered into large units on shore, each unit can be barged out to sea and lifted onto the platform without dismantling. This minimizes the assembly work that must be done on the platform itself. The less work done at sea, the cheaper the job.

For better communications . . . Good communication is an absolute necessity to operate offshore production. The men who tend offshore wells very often live in quarters on a remote platform, not going to a central office oftener than once each week. This makes radio communication vital.

Ordinary short-wave frequencies have became so crowded that Magnolia Petroleum has installed a new microwave system to link its platforms in the Eugene Island area. The photo on the front cover of this issue shows one of the platforms so equipped. The antenna is at center, carried by a converted production derrick. To begin with, the microwave system is being used solely for voice communication. However, later on, more channels can be added for telemetering and remote control of production equipment.

Shell Oil Co. has recently installed a new dial-phone system to connect certain offshore structures with shore bases. In this system there's no need for a phone operator to place calls. Either shore or marine personnel can dial direct at any time of day or night.

Good weather record . . . Of course, the weather is one big reason for the need of good communications offshore. It became obvious long ago that offshore workers could "secure" and avoid a lot of damage if forewarned of rough weather. Thus far the industry's severe-weather record is good. A few drilling structures have been badly damaged in heavy weather, but the producing equipment has stood up very well.

During hurricanes, producing platforms directly in the path of the storm lose railings and other light equipment not securely fastened. There have been several cases of flow lines breaking where they emerge from the water and go up on a platform. But most major equipment has come through unharmed. This is a tribute to good design but it is also testimony to a reason for the high cost of offshore operation.

Cheap storage still a goal . . . Offshore pipelines are so costly that only a major oil reserve can justify one. Many of the offshore fields already discovered do not fall into the "major reserve" category. For these there is still a search for a cheap way to get the oil to shore.

The first problem is platform storage. Any platform storage is expensive to build. To avoid this expense some wells are produced directly into barges tied up alongside the platform. But such installations are highly vulnerable to the weather. And the well flowing into a barge is certain to lose a lot of production time.

Even with adequate platform storage it usually costs 40 to 75 cents per barrel to barge the oil to shore. This extra cost makes it still harder for offshore oil to show a profit in competition with onshore crude.

Deep-Sea Tanker Terminal?

A favorite dream of offshore producers is a deep-sea tanker terminal. They visualize pumping accumulated offshore oil directly into a tanker and avoiding the expense of barging or pipelining oil to shore. To make such a plan practical there has to be a cheap way to store a tanker load of oil offshore. The general plans are often advanced to do this.

First is a submerged steel tank. Such a tank might be safely away from weather damage and, as a result, fairly cheap. There are, however, many mechanical problems involved in anchoring the tank, getting oil into it, and then displacing the oil out again with sea water.

The second suggestion is leached-out storage in a shallow salt dome. Such storage is common for liquefied petroleum gases onshore. Perhaps some day a good oil field found far into the sea will make such a experiment worth while.

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OFFSHORE REPORT

Don't shelve Continental Shelf

It's still regarded as nation's No. 1 remaining source of new petroleum reserves and production

BY NEIL WILLIAMS

THE PRESENT lull in drilling in the Gulf of Mexico along the Louisiana and Texas coast does not necessarily spell the doom of further active exploration and development in offshore areas of these states.

Nor does it reflect any lessening of previous high evaluations of potential oil and gas reserves and possible productivity in these offshore areas.

The Louisiana-Texas Continental Shelf continues to be regarded generally as one of the country's greatest remaining sources of new petroleum reserves and production.

Although its exploratory buildup of the last several years has resulted in the discovery of an impressive array of fields (124 off both states to May 1—see Table 1), indications are that its potentialities for additional drilling and development are myriad.

Drilling off the Louisiana coast has dropped from more than 110 active operations at the peak late last summer to a present figure under 50. Drilling off the Texas coast never has been widespread, but has declined from a top number of 10 active operations last summer to only 6 at this time.

This has idled a large number of offshore drilling rigs, some of which never had been to sea. These now are tied up at wharfs and shipyards along the Louisiana coast where they await an anticipated early revival of offshore drilling activity.

That this revival will come and provide plenty of work for at least all present offshore rigs for years to come seems certain. Not only are there a large number of previously undrilled high-cost lease blocks which must be tested with at least one well each before lease-expiration dates, but additional development in and around existing fields will require the drilling of large numbers of wells over an indefinite period.

Relatively few offshore fields can be considered extensively developed, none fully. No Gulf Coast field, specifically one directly associated with a salt dome, ever is fully developed.

Table 1—Offshore Wells by Areas

Area	No. fields	Oil	Gas/ cond.	Total producers	Dry	Total
West Cameron	8	29	49	78	22	100
East Cameron	9	1	28	29	12	41
Vermilion	12	5	34	39	13	52
Eugene Island	15	145	20	165	59	224
Ship Shoal	12	55	16	71	55	126
South Pelto	1	2	6	8	4	12
South Timbalier	8	21	4	25	19	44
Bay Marchand	2	137	23	160	43	203
Grand Isle	4	89	11	100	28	128
West Delta	14	113	26	139	49	188
South Pass	10	494	21	515	38	553
Main Pass	12	255	19	274	39	313
Breton Sound	4	20	15	35	17	52
Chandeleur Sound	3	3	4	7	5	12
Louisiana Offshore	114	1,369	276	1,645	403	2,048
Texas Offshore	10	10	39	49	18	67
Total	124	1,378	316	1,694	421	2,115

Table 2—Offshore Fields by Number of Wells

Area	Total no. fields	No. fields with: 100 plus wells	50-100 wells	20-50 wells	10-20 wells	5-10 wells	1-5 wells
Louisiana:							
West Cameron	8			1	3	2	2
East Cameron	9					5	4
Vermilion	12				1	1	10
Eugene Island	15		1	4		6	4
Bay Marchand	2	1					1
Grand Isle	4		2		1		1
Ship Shoal	12		1		3	2	6
South Pelto	1				1		
South Timbalier	8				2	2	4
West Delta	14	1		1		3	9
South Pass	10	1	1			3	5
Main Pass	12	1	1		2	2	6
Breton Sound	4			1	2		1
Chandeleur Sound	3					1	2
Total	114	4	6	7	15	27	55
Texas Fields	10			1	1	1	7
Total	124	4	6	8	16	28	62

Table 3—Development Drilling Offshore Has Been Confined to Very Few Areas

Louisiana:	No. fields	Total wells	Per cent of total wells
All fields	114	2,048	100
100 plus wells	4	953	46-1/2
50 plus wells	10	1,257	61-2/5
20 plus wells	17	1,525	74-1/2
10 plus wells	32	1,723	84

Louisiana:

4 fields with 100 or more wells drilled 953 wells or 46-1/2 % of total wells
6 fields with 50 to 100 wells drilled 404 wells or 19-7/10% of total wells
7 fields with 20 to 50 wells drilled 168 wells or 8-2/10% of total wells
15 fields with 10 to 20 wells drilled 198 wells or 9-7/10% of total wells
27 fields with 5 to 10 wells drilled 185 wells or 9 % of total wells
55 fields with fewer than 5 wells drilled 140 wells or 6-8/10% of total wells

The coastal area's thick sedimentary section with its multiplicity of horizons and sands, varied types of traps, and highly segmented reservoirs and lenses always insures additional possibilities for drilling. Consequently, even in the few widely drilled offshore fields, there always will be room for more drilling.

The great majority of offshore fields have had only limited drilling. Many have only the discovery well to prove them, or possibly a second well for confirmation. (See Tables 2 and 3). This is particularly true where the initial wells have been gas-productive. In the absence of gas lines these wells must be shut in, and in some cases further development suspended. The multiplicity of sands leaves the way open for finding oil reservoirs and additional development. There now are 10 one-well fields with discoveries dating as far back as 1949.

Drilling in and immediately around the 114 Louisiana offshore fields totals 2,048 wells to date. These exclude the wildcats and other exploratory drilling outside these fields. Fifty-five, or nearly one-half of the 114 offshore fields, have had fewer than 5 wells each. Their total is only 140, or less than 7% of all the field wells drilled.

The great mass of offshore drilling has been in only a handful of fields. Only 4 fields have had enough drilling to get into the 100-well class. These account for 953 wells, or 46½ % of the total drilling. Nearly half of these have been in one field, South Pass Block 24. This field, discovered in 1950, is at the tip of the Mississippi River Delta, in Plaquemines Parish, and embraces a large onshore extension area. Other 100-well fields include Bay Marchand Block 2 field, adjacent to the coast of Lafourche Parish, with 210 wells; Main Pass Block 69 field, off the east side of Plaquemines Parish, 173 wells; and West Delta Block 30, off the west side of Plaquemines Parish, 129 wells.

Only 6 additional fields have had more than 50 wells. Drilling in these fields has totaled 404 wells, or nearly 20% of the total. There are 7 fields in the 20 to 50-well class (mostly 20 to 30 wells), accounting for 168 wells, or 8.2% of the total; 15 fields in the 10 to 20-well class with 198 wells, or 9.7%; and 27 fields in the 5 to 10-well class with 185 wells, or 9%.

Thirty-two fields, less than one-third of the total, with 10 or more wells, account for 1,723, or more than 84% of the total number of field wells drilled. Each of the remaining 82 fields is likely to have at least 10 wells eventually; this will call for at least 500 wells in these fields alone, not to mention the many additional wells which can be expected to be drilled in the other fields. Not many fields will ever equal, or approach, the 450 wells drilled in South Pass Block 24 field, but it's fairly certain that a number of additional fields will get into the 50-well, and even the 100-well class.

Only 67 wells have been drilled in Texas' 10 offshore fields. The top field is Chevron, off the coast of Kleberg County, where 27 wells have been drilled. The next highest number of wells is in High Island Block 10-Large field, where 11 tests have been drilled.

From this it can be seen that even without the discovery of any additional new fields, offshore rigs can be kept busy in a continuation of exploration and development in fields already found.

So far this year, only three new fields have been discovered as contrasted with eight found in the same period during 1957. They include Vermilion Block 86 and West Delta Block 70 fields, opened in February, and South Timbalier Block 131 field, a late March discovery. The West Delta Block 70 discovery well is oil-productive with completion in three sands. It is the first triple completion in offshore operations. The South Timbalier discovery is oil-productive from a 6,700-ft. sand. The Vermilion discovery is productive of gas and condensate from a 10,800-ft. sand.

Distance From Shore

The offshore distance record remains at approximately 60 miles, although most of the drilling still has been within 30 miles of shore. The deepest water in which drilling operations have been carried on remains in South Timbalier Block 135 field, where the water depths are from 135 to 140 ft.

Louisiana's 114 offshore fields still represent only a small portion of the total number expected to be found eventually if the offshore field density is to equal that on a comparable onshore portion of the coastal area. Inshore-field density figures as much as 4½ times that offshore at this time. With comparable geological conditions the same density should result in a total of more than 500 fields eventually in the offshore areas. This would mean the discovery of an additional 386 fields. If they should average 10 wells each, (8 wells under the average number for the present 114 fields) their discovery and development would boost the amount of potential drilling yet to be done into the thousands of wells.

"The great majority of offshore fields have had only limited drilling. Many have only the discovery well to prove them, or possibly a second well for confirmation. This is particularly true where the initial wells have been gas-productive. The multiplicity of sands leave the way open for finding oil reservoirs and additional development."

Table 4—Louisiana Offshore Fields

Field block	Discovery year	Discovery operator	Wells drilled: Oil	Gas or cond.	Dry	Total	Producing depths (range-ft.)	Deepest test (ft.)
WEST CAMERON AREA:								
2 (Creole)	1938	Superior-Pure	14		4	18	3,100- 6,900	12,257
33	1949	Phillips-Kerr-McGee	1	2	1	4	1,650-11,150	14,720
40	1955	Phillips		3		3	9,500-13,900	14,072
45	1949	Stanolind (Pan American)	5	4	8	17	6,690- 9,900	14,671
71	1955	Superior	4	4	1	9	11,770-12,600	16,916
110	1954	Magnolia	3	5	1	9	4,000- 8,690	12,900
149	1949	Superior		13	2	15	4,460- 8,750	12,489
192	1954	CATC Group (Conoco)	2	18	5	25	4,900-10,500	14,040
Total (8 fields)			29	49	22	100		
EAST CAMERON AREA:								
4	1955	Forest Oil Co.		4	2	6	9,260-13,100	14,548
9	1957	Natural Gas & Oil-Magnolia-Ocean		2		2	12,400-12,900	13,440
17	1955	Shell		4	3	7	11,950-13,050	14,102
49	1955	CATC Group (Conoco)		1	3	4	11,090	13,888
62	1956	CATC Group (Conoco)		4	1	5	6,500- 8,310	13,505
64	1957	Magnolia		5	1	6	9,800-11,200	12,916
71	1954	CATC Group (Conoco)		4	1	5	8,000- 9,700	12,350
126	1957	Pure		1	1	2	8,100	8,355
160	1956	California	1	3		4	8,660-11,420	12,303
Total (9 fields)			1	28	12	41		
VERMILION AREA:								
14	1956	Stanolind (Pan American)		2	1	3	10,350-10,990	11,150
26	1956	Union Oil Co. of California		1	5	6	10,730	13,570
39	1949	Pure		17	1	18	7,500- 9,700	11,125
46	1956	Magnolia		4		4	6,550- 8,270	13,540
66	1956	Pure		4		4	7,300-10,400	10,700
71	1948	Superior		2		2	9,600- 9,900	10,000
76	1949	Superior		1		1	7,400	11,603
86	1958	Zapata Offshore-Felmont		1		1	10,800	10,910
96	1957	CATC Group (Conoco)		1	2	3	3,570	14,005
102	1956	Superior		1	2	3	7,350	10,893
120	1957	CATC Group (Conoco)	3		1	4	7,300- 8,670	14,025
164	1957	Shell	2		1	3	6,100- 6,758	10,130
Total (12 fields)			5	34	13	52		
EUGENE ISLAND AREA:								
18	1954	Shell	14	3	7	24	9,100-10,300	12,270
27	1956	The Texas Co.		1	1	2	10,470	12,165
32	1949	Pure	16	1	5	22	7,550-12,030	13,741
45	1948	Magnolia	6	2	1	9	9,500-11,350	14,050
47	1955	Pure		1	1	2	8,480	13,577
53	1957	Union Producing Co.		1	1	2	12,270	14,040
†58	1950	Magnolia	1		8	9	11,206	13,880
*77	1956	Humble		3	2	5	14,000-15,900	16,058
110	1949	Magnolia	8	2	10	20	7,900-12,130	15,940
126	1949	Magnolia	67		4	71	4,000-12,750	13,206
128	1955	Magnolia	24	2	5	31	5,200-12,950	15,004
175	1956	Sinclair	4		4	8	11,800-11,870	13,500
184	1956	Phillips		4	3	7	10,230-14,800	15,052
188	1956	Shell-Humble	3		5	8	10,490-12,430	13,008
191	1957	Phillips	2		2	4	8,670- 9,080	11,125
Total (15 fields)			145	20	59	224		
BAY MARCHAND AREA:								
2	1949	California Co.	137	21	43	201	2,100-10,700	13,042
5	1957	Phillips		2		2	10,660-11,750	13,375
Total (2 fields)			137	23	43	203		

*Proved salt dome. †Abandoned.

Table 4—Louisiana Offshore Fields (Continued)

Field block	Discovery year	Discovery operator	Wells drilled: Oil	Gas or cond.	Dry	Total	Producing depths (range-ft.)	Deepest test (ft.)
GRAND ISLE AREA:								
16	1948	Humble	30	7	15	52	1,530-13,060	14,691
18	1948	Humble	44	2	11	57	1,730-10,100	13,801
43	1956	CATC Group (Conoco)		2	1	3	7,900-12,730	15,523
47	1955	CATC Group (Conoco)	15		1	16	8,380-13,600	16,189
Total (4 fields)			89	11	28	128		
SHIP SHOAL AREA:								
23	1951	Shell		1		1	2,660	14,000
28	1949	Kerr-McGee		3	4	7	8,500-13,640	14,451
32	1947	Kerr-McGee	7	2	4	13	1,730-12,590	13,362
39	1957	Pan American		1		1	16,830	18,002
(Coon Point)								
67	1955	Ocean Drilling & Exploration	2	2	1	5	9,790-12,230	12,644
72	1948	Magnolia	7	3	3	13	6,950-12,180	16,004
107	1957	California Co.	1		2	3	9,400	12,002
113	1955	Magnolia	4	1	5	10	7,300-12,870	16,217
139	1957	Shell		1	3	4	12,770	15,006
*150	1955	Gulf			1	1	(*)	9,000
154	1955	Gulf	34	1	31	66	4,800- 9,790	15,072
176	1956	Gulf		1	1	2	6,700	12,903
Total (12 fields)			55	16	55	126		
SOUTH PASS AREA:								
5	1955	California Co.	2		1	3	8,700- 9,090	11,000
6	1955	Shell	3	3		6	8,300	11,010
20	1956	Humble-Gulf		2	3	5	9,520-11,570	14,006
21	1956	Shell		1	1	2	10,160	11,153
24	1950	Shell	421	7	22	450	6,500-10,200	13,000
26	1957	Shell		1		1	3,200	9,505
27	1954	Shell	63	2	6	71	6,300- 8,300	11,002
30	1955	Shell		2	1	3	7,970- 9,530	13,468
41	1955	California Co.	5		4	9	7,960-10,170	13,972
42	1956	Shell		3		3	6,940- 8,380	14,040
Total (10 fields)			494	21	38	553		
MAIN PASS AREA:								
Lake Fortuna								
1 & 12	1953	O'Meara Bros.	1	1		2	8,400	10,015
23	1954	California Co.	1		2	3	7,450	9,504
24	1953	California Co.	3			3	8,260	10,500
25	1955	Continental	3		5	8	6,200	10,130
35	1951	Shell	75	2	10	87	6,000- 8,250	10,178
40	1956	California Co.		1		1	3,480	10,000
41	1957	California Co.	7		4	11	6,840- 9,740	10,120
46	1956	Magnolia	3	2	4	9	8,760-14,290	16,708
47	1955	Kerr-McGee	3	5	2	10	8,190- 9,020	11,050
48	1956	Phillips		2	1	3	3,480- 8,470	10,013
53	1957	Kerr-McGee	1	1	1	3	9,000- 9,680	11,000
69	1948	California Co.	158	5	10	173	5,000- 8,900	10,950
Total (12 fields)			255	19	39	313		
BRETON SOUND AREA:								
1	1955	Republic Natural Gas		1	3	4	7,420	9,682
20	1953	Kerr-McGee	16	5	4	25	4,280- 6,050	9,000
32	1949	Sunray	4	6	3	13	5,600- 5,800	9,022
36	1948	Sunray		3	7	10	3,800- 6,700	10,609
Total (4 fields)			20	15	17	52		

*Proved salt dome, no production.

Table 4—Louisiana Offshore Fields (Continued)

Field block	Discovery year	Discovery operator	Wells drilled: Oil	Gas or cond.	Dry	Total	Producing depths (range-ft.)	Deepest test (ft.)
CHANDELEUR SOUND AREA:								
Eloi Bay								
48	1953	Phillips	3	2	3	8	4,850- 5,870	15,234
41	1954	Phillips	...	1	2	3	6,250	9,506
69	1954	The Texas Co.	...	1	...	1	7,013	9,564
Total (3 fields)			3	4	5	12		
SOUTH PELTO AREA:								
20	1951	Magnolia	2	6	4	12	8,100-11,100	12,770
SOUTH TIMBALIER AREA:								
15	1955	Sinclair	...	1	1	2	11,900	13,756
21	1957	Gulf	4	...	1	5	11,600-11,700	12,900
34	1949	Humble	1	1	1	3	3,720- 9,550	13,369
*52	1950	Humble	1	...	2	3	11,200-12,090	13,519
54	1955	Humble	6	1	4	11	6,850-12,940	14,603
86	1956	Sinclair	4	...	3	7	12,160-13,190	14,100
131	1958	Gulf	1	...	1	2	6,700	7,667
135	1956	Gulf-Humble	4	1	6	11	10,420-14,350	143,638
Total (8 fields)			21	4	19	44		

*Abandoned in 1953.

WEST DELTA AREA:								
24	1957	Humble	...	2	...	2	12,000	15,450
25	1956	Humble	1	...	1	2	8,290	12,863
27	1949	Humble	...	2	2	4	9,470-11,990	12,233
30	1949	Humble	96	3	30	129	2,150-12,240	12,415
45	1955	CATC Group (Conoco)	1	...	2	3	5,750- 7,310	14,508
52	1954	CATC Group (Conoco)	1	2	2	5	7,630	13,538
53	1953	CATC Group (Conoco)	6	10	5	21	4,800-12,530	14,625
55	1955	CATC Group (Conoco)	...	2	...	2	4,844-12,500	14,030
56	1955	CATC Group (Conoco)	...	1	1	2	4,360	14,088
58	1955	CATC Group (Conoco)	...	2	2	4	11,670-14,200	15,606
59	1955	CATC Group (Conoco)	2	1	3	6	12,340-13,000	14,116
70	1958	CATC Group (Conoco)	1	...	...	1	8,350- 9,240	13,495
81	1957	CATC Group (Conoco)	...	1	...	1	2,740	13,883
94	1955	CATC Group (Conoco)	5	...	1	6	7,870-11,030	14,500
Total (14 fields)			113	26	49	188		

Table 5—Texas Offshore Fields

County—Area and discovery operator—	Field	Discovery year	Wells drilled: Oil	Gas or cond.	Dry	Total	Producing depths (range-ft.)	Deepest test (ft.)
Galveston—Galveston:	144-Large	1955	...	2	2	4	6,740- 9,900	11,007
Pan American	189-Large	1955	2	1	1	4	6,570- 7,520	12,923
Pure								
Jefferson—High Island:								
Pan American	(1)84-Small	1956	1	...	2	3	6,510	6,798
Magnolia	10-Large	1955	...	7	4	11	5,200- 9,700	13,386
Matagorda—Brazos:								
Shell	Kain Ext.	1954	...	3	1	4	3,670- 5,200	9,085
J. S. Michael	S. Sargent	1957	...	3	...	3	3,300- 4,130	6,602
Nueces—Mustang Island:								
Arkansas Fuel Oil	905-Small	1957	...	3	1	4	7,800- 9,050	12,250
Gulf	889-Small	1955	...	4	1	5	11,450-12,620	14,105
Kelberg—Mustang Island:								
Standard Oil of Texas	Chevron	1954	7	15	5	27	6,360- 9,500	10,855
Sun	Sprint	1954	...	1	1	2	9,100	14,042
Total (10 fields)			10	39	18	67		

OFFSHORE REPORT

OFFSHORE PIPELINES—and

BY GENE T. KINNEY AND LARRY RESEN
Assistant Pipeline Editor District Editor

THIS YEAR will be the biggest yet in construction of pipelines in the Gulf of Mexico.

A survey by The Oil and Gas Journal indicates that 312 miles of pipe, all gas or gas-condensate lines, will be laid off Louisiana during 1958. An additional 49 miles has already been announced for 1959. The offshore pipeline network now amounts to about 500 miles.

The sharply increased construction, indicated by dashed lines on the map, is an important barometer of business for offshore producers. It means that the huge outlays of capital spent for exploration and development of offshore reserves, particularly gas, will start paying off.

Gas Lines Planned

Transcontinental Gas Pipe Line Corp. has the most aggressive program ever undertaken offshore. Transco has under way or planned 150 miles of 7 to 20-in. line in the gulf. Tennessee Gas Transmission Co. is adding to its shore system 61 miles of 12 to 26-in. in the East and West Cameron areas and has pending with the Federal Power Commission 14 miles of 16-in. in the Vermilion area.

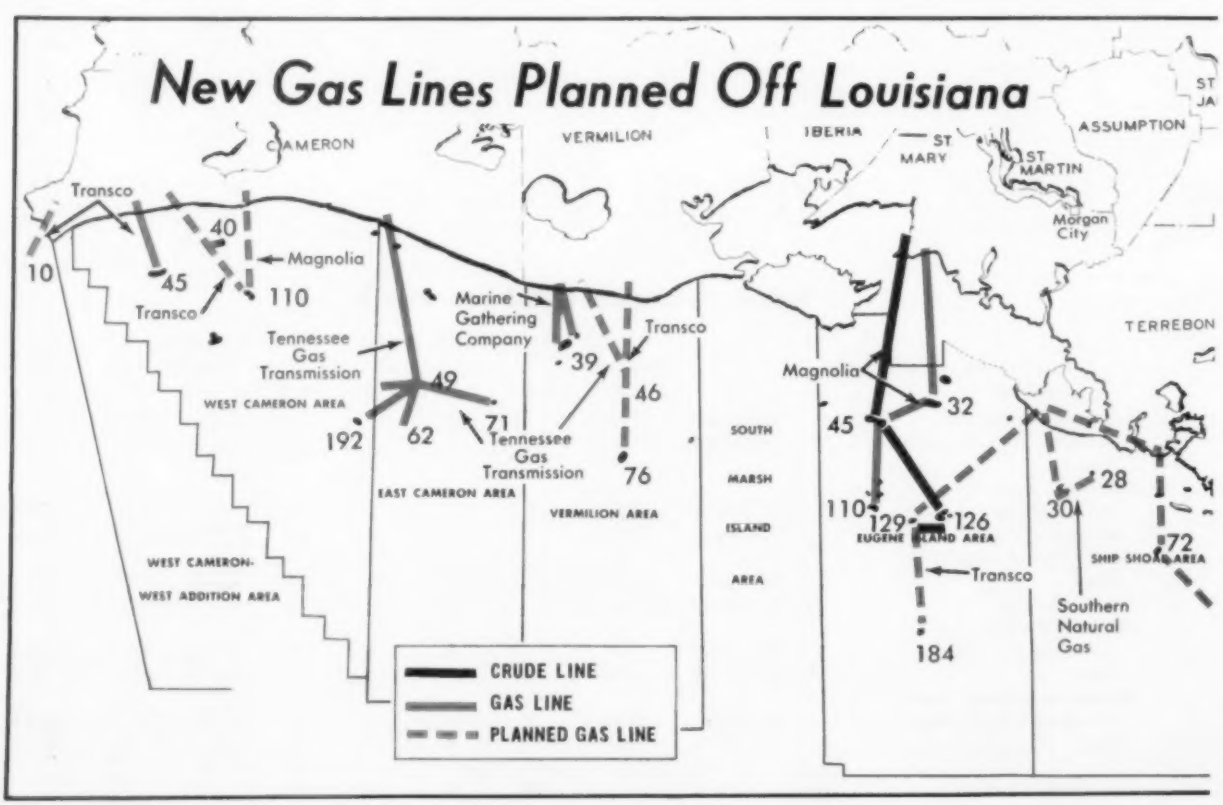
Southern Natural Gas Co. has completed 43 miles of 4 to 12-in. in the Black Bay area and plans 21½ miles in the West Delta area before the end of 1958. Southern Natural plans 49 miles in the Ship Shoal area next year. Magnolia Petroleum Co. will lay a 22-mile, 16-in. gas-condensate line, already under contract, from West Cameron Block 110 field to shore. Small but important offshore systems also have been built by United Gas Pipe Line Co., Humble Oil & Refining Co., the CATC group, and Marine Gathering Co.

No large-diameter common-carrier crude lines have been laid in the gulf. Crude now transported to shore by pipeline moves in a two-phase stream with gas in flow lines. Treatment and separation are performed on shore, then crude is shipped by pipeline or barge.

The 20-in. Delta Pipe Line, which will be built this summer by Shell Pipe Line Corp., will handle up to 90,000 bbl. per day of offshore and coastal production. But it will not extend out into the gulf. Crude will be barged to shore terminals and then tendered to the pipeline, which will run from the Mississippi River Delta to the Norco refinery of Shell Oil Co. near New Orleans.

In exposed areas which are subject to frequent or prolonged spells of bad weather, barging is far from satisfactory. For one thing, it does not permit full production of allowables as would be possible if fields were connected to a pipeline whose operation would be unaffected by weather.

The situation has led to considera-



what it costs to build them

ESTIMATED OFFSHORE PIPELINE COSTS

Cost ($/ ft.) Diameter (in.)

	10	12	*12	14	16	20
Pipe	4.56	4.00	6.03	4.70	6.52	6.27
Coating	0.50	4.02	1.56	3.00	3.25	7.47
Contract	8.13	9.00	6.81	9.38	10.00	9.00
Misc.	1.21	2.43	1.40	1.27	1.30	2.06
Total	14.40	19.45	15.80	18.35	21.07	24.80

*Figures for a second 12-in. line are listed to show the wide variation in cost estimates.

ESTIMATED MID-CONTINENT PIPELINE COSTS

Total	5.78	7.02	8.17	9.46	11.60

tion of a major common-carrier line offshore. But such a line, for all its advantages, is not without serious disadvantages itself. For much of the inherent superiority of a pipeline may be offset by problems of treating, separation, royalty measurement, dual-phase handling, gravity adjustment, and varying field prices, as well as the extremely high costs of construction

Offshore Construction Costs

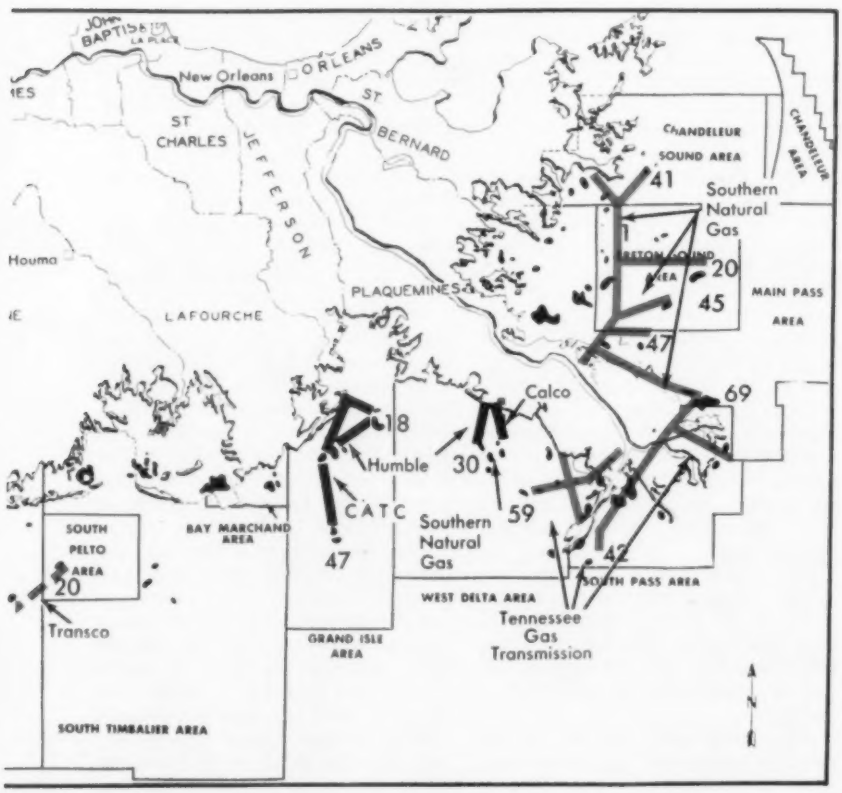
The limited experience, the complexities of offshore pipelining, the risks, and the many variables on each job conspire against developing accurate representative cost data. Cost figures presented in FPC dockets the past 12 months are analyzed in the accompanying table. They are actually little more than educated guesses, but were the best estimates possible under the circumstances.

The figures are significant in comparison with onshore costs but for several reasons cannot be a dollar-and-cents guide for estimating a new line. One of these is the vagaries of weather.

Anomalies apparent in the cost table are eloquent testimony to the risks involved. For instance, the 20-in. laying costs were estimated to be less than for some 14 and 16-in. pipe. Water depths and distance from shore may account for part of the discrepancy.

The difference in the two 12-in. lines in the table underscores the difficulty of pinning down costs. Pipe for the second 12-in. line was bought on a conversion basis and was therefore more expensive. However, all other items were less than the other project estimates and so was the total cost. While total costs run double or better this doesn't reflect the magnitude of increased construction costs. If you exclude pipe, which will cost about the same onshore as offshore, the remaining investment will run anywhere from four to six times as great.

A rule of thumb which has been worked out by one company, using its own offshore experience and that of others, is $1 per foot per inch of diameter plus $3 per foot of linear length. The $1 per foot per inch breaks down to 50 cents for construction, and 50 cents for pipe and coating. The construction formula is low below 12-in. and high above that diameter. The pipe and coating formula is high below 12-in. and low above that figure. But the variations tend to offset each other within the over-all rule of thumb. These figures assume that construction is done during the most favorable season.



PAYOFF for the huge outlay of capital spent for exploration and development of offshore reserves, particularly gas, will start soon, as indicated by the dashed lines on this map.

OFFSHORE REPORT

No tidelands settlement in sight

Industry showing little interest in leasing in affected areas

BY BERTRAM F. LINZ
District Editor

THE INTERIOR DEPARTMENT is all set to go ahead with the leasing of more oil and gas lands in the outer Continental Shelf.

But it can't do much in that line before next year, at the earliest. And it will be some years before the last issues in the two-decade fight over the "tidelands" are finally settled.

What may be some of the best oil areas in the whole shelf are tied up in a suit in the U. S. Supreme Court. These are the lands off Louisiana, between the government-claimed 3-mile limit and a state-claimed boundary which in some places runs 40 miles from shore.

The high court, possibly before the end of this year, will decide whether the federal Government or the state holds title to the oil, gas, and sulfur resources in this disputed zone.

The court will hear argument October 13 on the Government's claim that no state may have a seaward boundary beyond that of the nation. The case involves not only Louisiana's boundary but those of the other gulf states—Texas, Mississippi, Alabama, and Florida—as well.

The Interior Department could make some leases in the disputed area off Louisiana without awaiting final court decision. An agreement signed October 12, 1956, provides that the state may grant leases out to the 3-mile limit and the Government may lease lands beyond the boundary claimed by the state

Supreme Court Ruling Awaited

An area between the 3-mile and 3-league lines is to lie dormant until the Supreme Court acts. The zone between the 3-league line and the state-claimed limit was tied up for a year, after which the department was to be free to make leases.

But so far, the industry has shown little interest in new leases in any of the areas which might be affected by the final boundary decision.

The fight over the resources of the Continental Shelf dates back to the early 1930's. It started with the filing of applications with the Interior Department for federal grants on submerged lands off California which were being developed under leases issued by the state.

The attempts to get federal leases in California's offshore oil lands continued. But nothing significant developed until former President Truman stepped into the picture.

Truman, in a proclamation issued September 28, 1945, laid claim to federal ownership of all resources of the Continental Shelf seaward of the low-water mark.

Clark Files Suit

Less than a month later, Atty. Gen. Tom C. Clark, now an associate justice of the Supreme Court, filed the first of a series of suits to establish the Government's rights in the oil lands off the coasts of California, Texas, and Louisiana.

The Supreme Court held on June 23, 1947, that the United States had "paramount rights" to the resources beyond California's low-water mark. It made similar findings with respect to Texas and Louisiana 3 years later.

When the Eisenhower administration came into office in 1953, Congress immediately set about righting the wrongs the states claimed had been done them.

A bill returning to the states all lands lying within their historic boundaries was signed by Eisenhower May 22, 1953. This was followed by another law providing for the administration of the Outer Continental Shelf as a government reservation.

The new laws immediately revived interest in the submerged gulf lands where there had been little new activity over the years in which title had been at issue.

Little more than a year later, the Interior Department sold its first leases on the Outer Continental Shelf Two more sales were held in 1955. From these three sales the Government collected more than $250,000,000 in bonuses.

But over the past 3 years new uncertainties dampened enthusiasm over shelf development.

The Submerged Lands Act of 1953 settled the issue raised in the case against California, except for the drawing of a line which would fix the 3-mile limit off certain bays and inward curves of the coast.

Texas, Louisiana, and Florida, however, claimed that their historic boundaries in the gulf were 3 leagues rather than 3 miles from shore.

The Justice Department moved to have this question settled. The Supreme Court gave permission on March 26, 1956, for the filing of a test suit against Louisiana.

The court heard argument on the issue April 8, 1957. The Government asked for an immediate order fixing the state boundary at 3 miles. The state demanded a full trial, either in Louisiana or in Washington, at which all evidence could be offered.

Both were turned down. On June 11 the court ordered a freeze on leasing by either federal or state officials on lands within the disputed area.

At the same time, the court moved to head off a series of suits to fix the boundaries of the gulf states one at a time. The line would be fixed for all five states in a single decision.

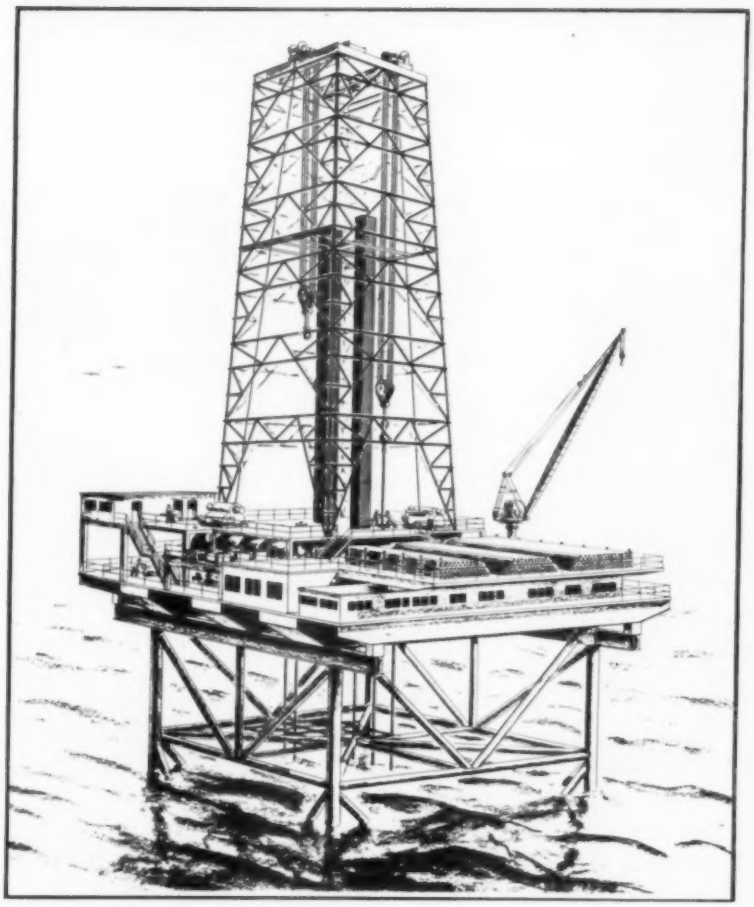
In all previous moves, Justice officials had brushed aside the state's arguments for a 3-league boundary as of no weight.

But in filing its amended complaint, the department tacitly admitted that the states might hold a valid position.

Department officials quoted statements by Eisenhower, both as a candidate for office and as President, supporting the states' claims to their "historical" boundaries. It noted, too, that Congress also had used that term in the Submerged Lands Act.

The court will be given "all" the facts, both for and against the Government's stand, it was promised.

But even after the Supreme Court rules where the boundaries of the gulf states run, and no matter in whose favor, much time will be required to draw the exact line between state and federal holdings. This will be particularly true in the case of Louisiana, where islands will complicate the task.



It's a first for California . . .

New permanent-type offshore platform will feature capacity to

Drill 2 wells at once, and up to 25 total

BY D. H. STORMONT
District Editor

CALIFORNIA'S first permanent-type drilling platform, from which the first well is due to be spudded about August 1, will introduce several new features to deep-water drilling.

Outstanding innovation will be the provision for the simultaneous drilling of two wells. Another unusual feature is the ease with which it can be converted to a production platform if economically practicable. Equipment for the bulk handling of dry mud materials and cement is compactly skid-mounted and is readily removable for use in another position. Drilling will be carried out with all-electric equipment.

The platform was designed by engineers of Standard Oil Co. of California, Western Operations, Inc., for use on the 5,500-acre state lease it jointly holds with Humble Oil & Refining Co. offshore from Summerland. The 167-ft.-high tower is scheduled to be submerged in mid-June in 100-ft. water about 2 miles offshore. After the 27-ft.-diameter, 40-ft.-high caissons have been dug in and ballasted to the ocean floor, the 110-ft.-square drilling deck will be lifted into place 50 ft. above water.

Placing the tower . . . How the 1,000-ton tower will be towed 200 miles northward from the San Diego shipyards of National Steel & Shipbuilding Corp. and sunk at the Summerland drill site is diagramed.

During the tow, the caissons will be pressurized to 10 psi. to prevent leakage. Each will be ballasted with 90 tons of sand for stability. They will draw about 20 ft. of water.

Key tool in the submerging operation will be J. Ray McDermott & Co., Inc., Pacific Division, 90-by-300 ft. barge, equipped with a 250-ton crane. As shown, the barge will be used to stabilize the tower during this operation. Buoyancy of the caissons will be reduced by adding water until the tower begins to slowly sink. The rate of descent then will be controlled by the barge crane, and by maintaining slightly negative buoyancy.

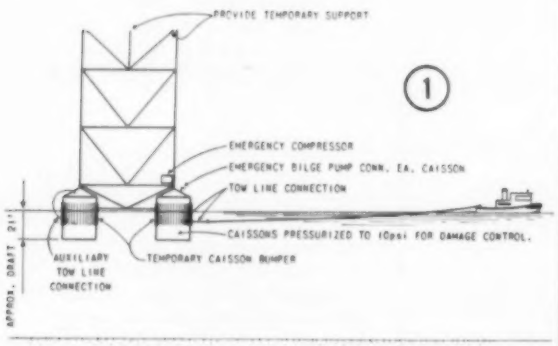
After the tower is bottomed on the ocean floor, the caissons will be jetted into place by high-pressure water. Cuttings will be removed by compressed air and lifted to the surface through pipes contained in each of the four legs. After the caissons are solidly in place, they will be anchored with 6,000 tons of sand and concrete. The two-tiered, prefabricated drilling deck and equipment will then be mounted on the tower including the derrick. Accompanying is an artist's sketch of the finished platform.

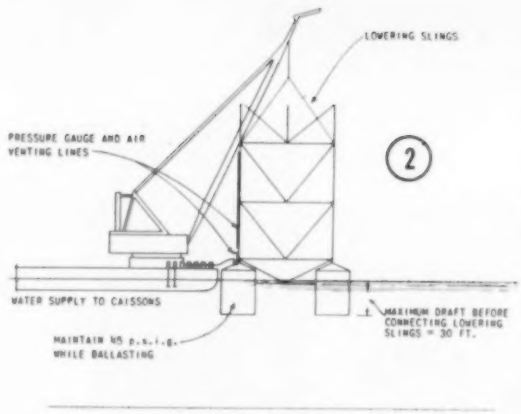
Superstructure features . . . Unlike Gulf Coast platforms from which only some 6 to 12 wells can be drilled, the Standard-Humble structure provides for as many as 25 wells. After their completion, drilling equipment may be removed to convert the platform to a producing structure.

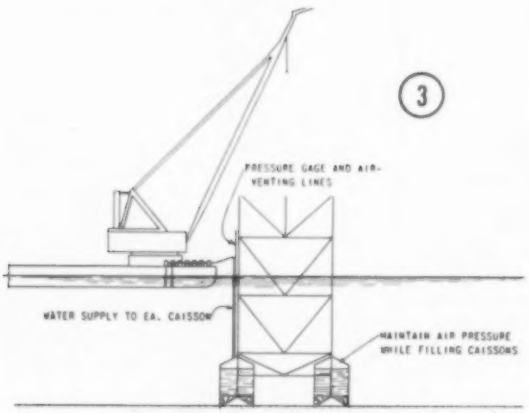
All separators, meters, manifolds, and other flow equipment for the 25 wells will be in place before drilling of the first well is started. Thus conversion to a producing platform will amount to little more than lifting off the drilling equipment. There will be no derrick on platform during producing operations.

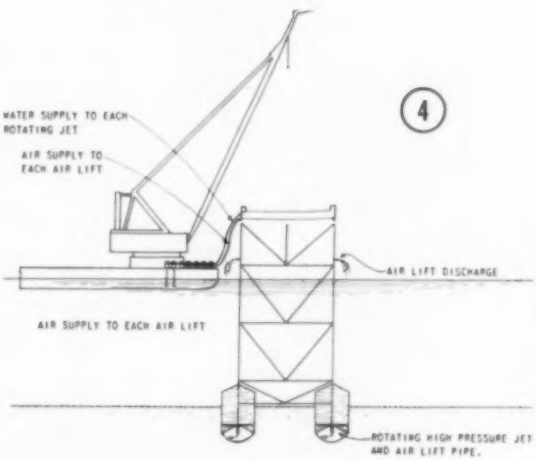
A novel 140-ft. derrick will be used. At the base it will be 45 by 45 ft., and at the water table it will be 30 by 30 ft. So that the crown blocks can be spotted exactly above each of

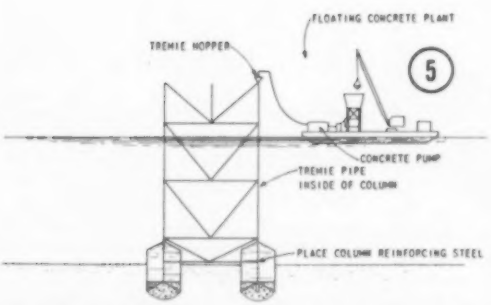
Six steps in submerging . . .

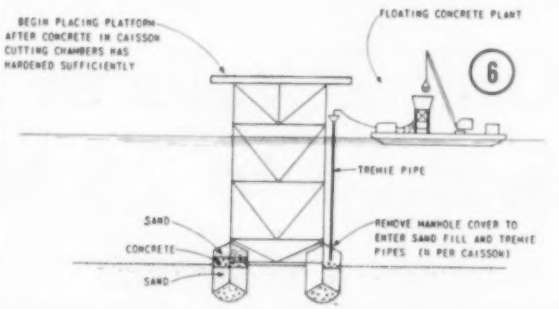



LOWERING SLINGS
PRESSURE GAUGE AND AIR VENTING LINES
2
WATER SUPPLY TO CAISSONS
MAINTAIN 45 p.s.i.g. WHILE BALLASTING
MAXIMUM DRAFT BEFORE CONNECTING LOWERING SLINGS = 30 FT.




WATER SUPPLY TO EACH ROTATING JET
AIR SUPPLY TO EACH AIR LIFT
4
AIR LIFT DISCHARGE
AIR SUPPLY TO EACH AIR LIFT
ROTATING HIGH PRESSURE JET AND AIR LIFT PIPE.




BEGIN PLACING PLATFORM AFTER CONCRETE IN CAISSON CUTTING CHAMBERS HAS HARDENED SUFFICIENTLY
FLOATING CONCRETE PLANT
6
TREMIE PIPE
SAND
CONCRETE
SAND
REMOVE MANHOLE COVER TO ENTER SAND FILL AND TREMIE PIPES. (4 PER CAISSON)

AFTER THE TOWER is towed to the site (1), the caissons will be pressurized with 45-psig. air and after sufficient water ballast has been added, the lowering slings will be connected to the barge (2). After the tower has been slowly lowered to the ocean floor, all air in the caissons will be replaced with water (3). The caissons then will be jetted into the overburden (4) and the tower securely anchored with 6,000 tons of sand and concrete. Final step in the process (6) will be to lift two-tiered drilling deck and equipment into place.

the 25 wells, a miniature derrick and hoisting equipment will be mounted above the water table.

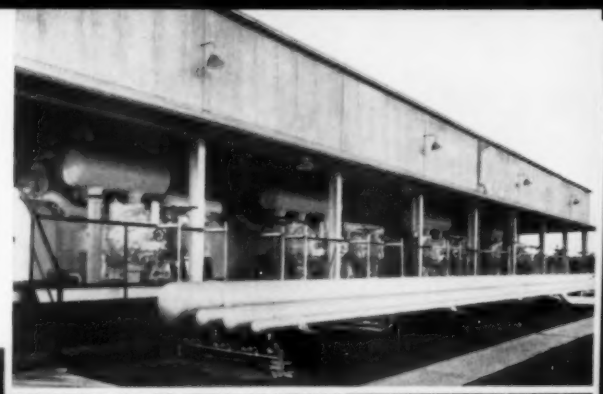
Initially only equipment for drilling one well will be mounted in the derrick. But it is designed for the simultaneous drilling of two wells. Ultimately there will be two crown blocks, two traveling blocks, two rotary tables, and two draw works.

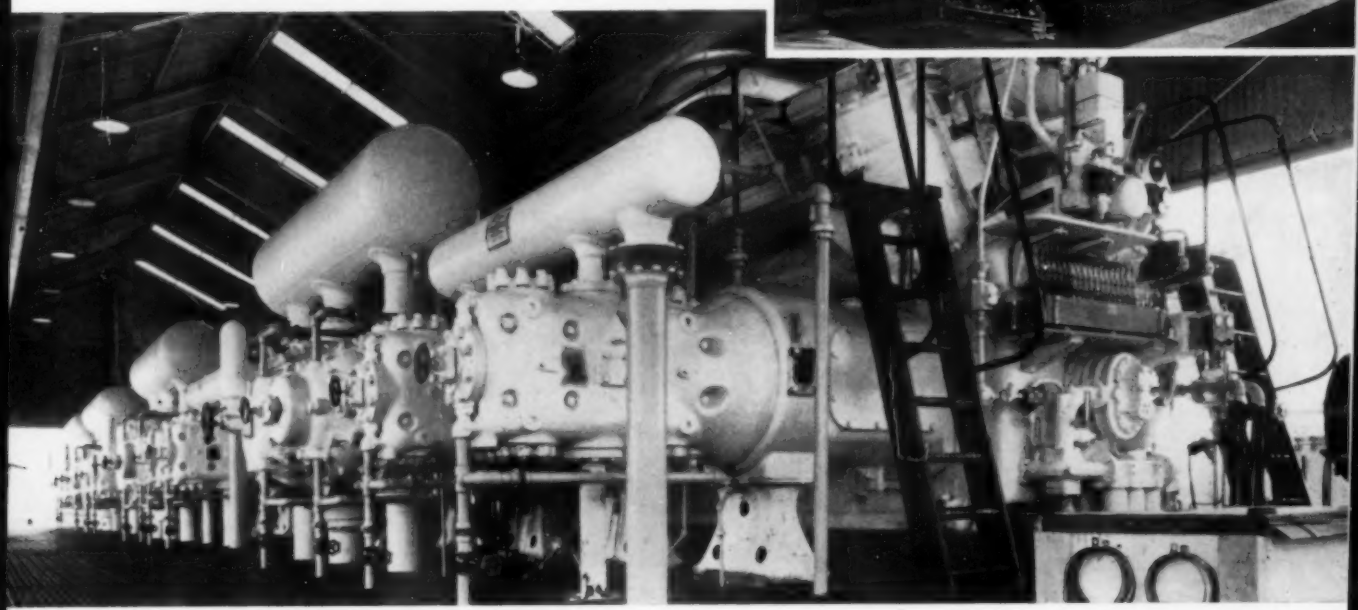
The derrick floor is divided into 25 prefabricated sections so that 25 wells can be drilled on 6½-ft. centers. As each well is drilled, two of these will be removed. The rotary table will then be mounted in one section and the standback rack will be installed in the other. Both the rotary table and pipe rack are designed so they will rest firmly on the steel girders which support the sectionalized derrick floor.

The two draw works, each powered by two 250-hp. a.c. motors, will

A *In the Fairbanks station of The Liquigas Company, a subsidiary of The Murmanill Corporation . . . three 8-cylinder Cooper-Bessemer GMVA's rated 1100 hp at 300 rpm and one 4-cylinder GMVA rated 540 hp at 300 rpm.*

B *Noted for "pulling ability", Cooper-Bessemer engine-driven compressors at Fairbanks deliver long-life service with minimum maintenance.*





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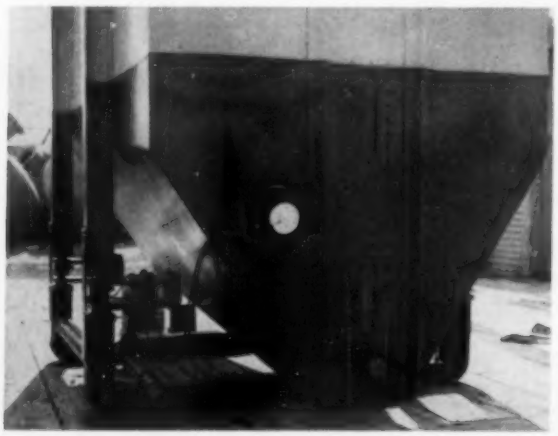
ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE OR MOTOR DRIVEN

NOVEL DERRICK for simultaneous two-well drilling as it was being rigged up late in May at Long Beach.

CEMENT AND MUD MATERIALS will be stored in these 570-cu.-ft. tanks skid-mounted with blowing equipment and lines.



ELECTRONIC WEIGHING EQUIPMENT will be used to determine amount of material moved into each surge tank.

be located on opposite sides of the derrick floor. They will be skid-mounted so they can readily be spotted in the correct position for the well to be drilled.

Power for the hoists, mud pumps, and other uses will be supplied from shore through a 16.5-kva. cable laid on the ocean bottom. Electric power was chosen in preference to diesel engines because its use eliminates necessity for transporting fuel, and to reduce attendant noise levels and exhaust. Its use also lowers the fire hazards, and completely removes all objections the public might have. In the event of a power failure, two diesel-engine-driven 200-kw. generators will be available for emergency drilling.

Bulk-handling equipment . . . To handle cement and mud materials used in large quantities, Halliburton Oil Well Cementing Co. designed a pneumatic bulk-handling system of the type used only on the very latest mobile-type drilling barges. Included are storage tanks for mud and cement, receiving tanks for barites and bentonite, and cement surge tanks, plus the pumping equipment, all controls, valves, and piping.

All equipment is compactly skid-mounted so it requires a minimum of deck space, and so it can be readily moved off when drilling is completed. It will require only some 912 sq. ft. of space when installed.

A tender boat which will ferry cement and mud materials from an onshore site to the platform will be equipped with pneumatic tanks. The dry materials will then be lifted from the tender boat to storage tanks by air-lift pressure units, using two 50-hp. compressors capable of handling 300 cu. ft. of air per minute at 40-psi. discharge.

On the platform, cement and mud materials will be stored in eight 570-cu.-ft. tanks, skid-mounted with the blowers and unitized piping. Then as need requires, the dry materials will be pneumatically shifted to one of three 240-cu.-ft. surge tanks. A 13-bag dust collector is integrally mounted with each skid-mounted surge tank. These remove all dust from the air used to lift the dry materials from storage to the surge tanks.

The surge tanks are equipped with a fully electronic weighing system. The amount of material contained in the tank is observed from a panel control board. Air used in moving the material into the surge tanks, and from them to the mixing hopper, is supplied by two 125-cu. ft. per minute, motor-driven blowers.

For carrying out cementing operations, a complete skid-mounted pumping unit will be installed on the main deck. Powered by 300-hp. diesels, each pump is capable of extremely large volumes and highest pressures.

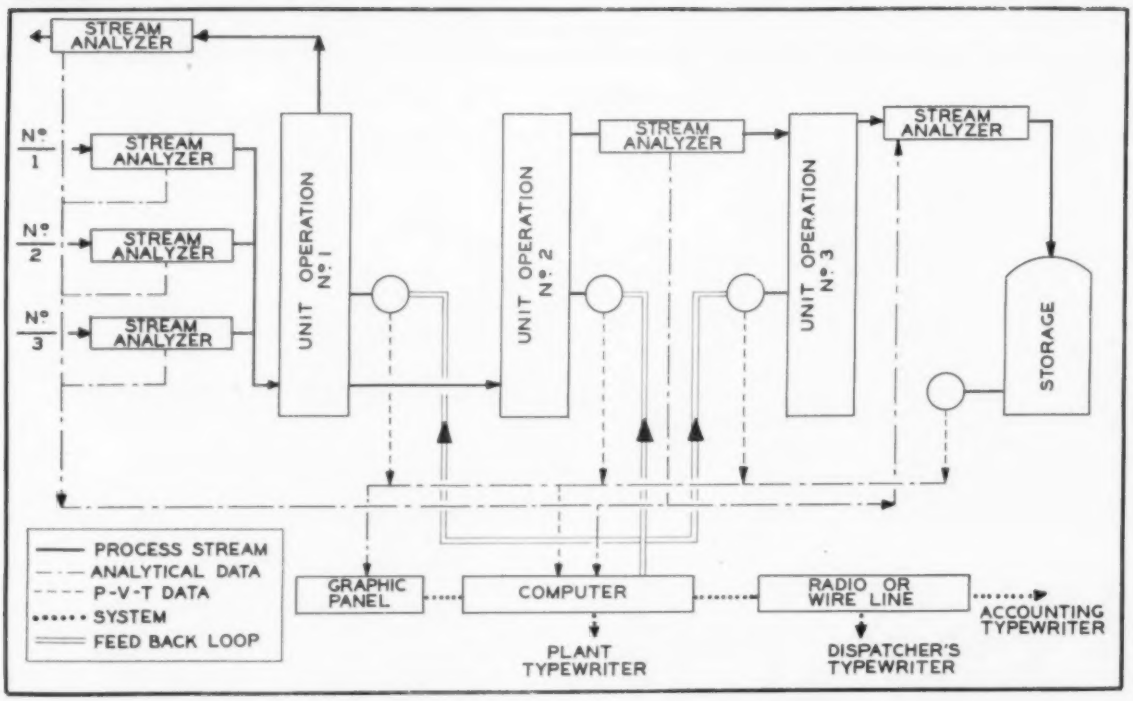
Other equipment to be installed after the drilling deck is in place includes two 700-hp., 16-in.-stroke mud pumps. Initially only one rotary table will be used, driven by a 300-hp. motor. When two-well drilling is started an identical unit will be added.

No quarters will be provided for the contractor's crews except on an emergency basis. Crews normally will be changed on an 8-hour-tour basis, using a helicopter for transportation. The heliport will be cantilevered over the side of the platform at the end of the pipe rack. In event foggy weather makes flying dangerous, a service boat will be used for changing crews.

All drilling will be done under contract by Western Offshore Drilling & Exploration Co.

Drilling equipment for the Summerland platform in late May was being assembled at a pier in Long Beach Harbor.

FIG. 1



Using a computer in this central system means . . .

Complete automation of a process plant

BY IRA C. BECHTOLD
Consultant, La Habra, Calif.

THE IDEAL control situation is to introduce the computer into the feedback loop of the control system (Fig. 1). Here it receives from the sensing instruments all of the same information now being received by the recorder-controllers.[1]

The fundamental nature of this computer will of necessity be that of the general-purpose computer now used in research and engineering calculations.

It may, however, be considerably smaller and limited in capacity and speed to fit the particular process at hand. Into this computer will be introduced essentially the same instructions as the process engineer would use in causing the computer to make computations in the design and sizing of equipment.[2]

For example, if the computer is used in a plant involving these unit operations: (1) fractionation, (2) absorption, (3) catalysis, (4) heat transfer, and (5) mixing or blending; its instructions, which are retained within its memory, may include many mathematical procedures. Typical ones are those involved in (1) material balance, (2) heat balance, (3) tray by tray calculations, (4) absorber sizing methods, (5) catalytic reactor design mathematics, (6) mathematical method for determining heat transfer rate, (7) proportioning calculations, or any other applicable mathematical procedures.

Paper presented at 1958 meeting, California Natural Gasoline Association, Los Angeles. The author maintains offices at 1987 Skyline Vista Drive, La Habra, Calif.

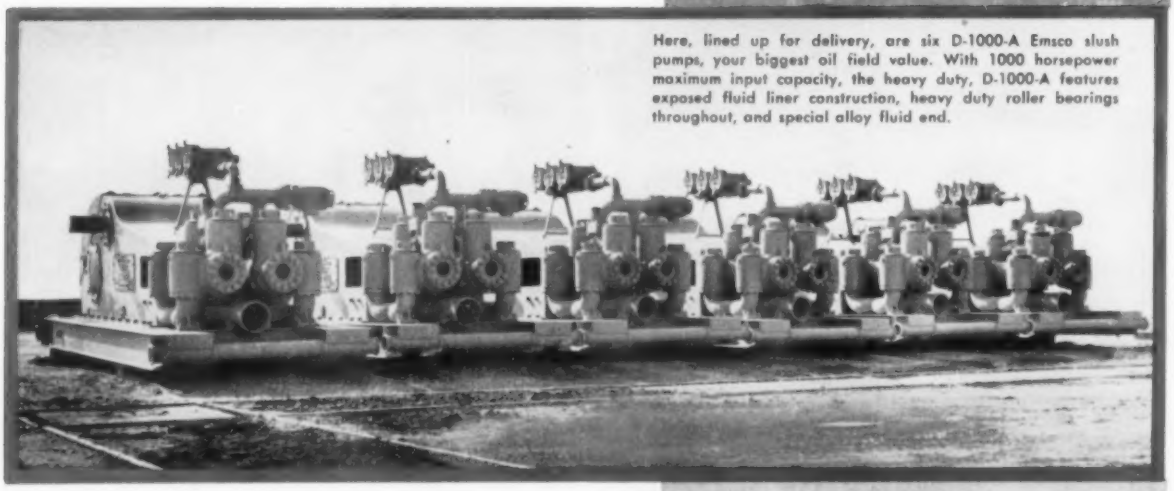
About computers . . .

Somewhat over 10 years ago the general development of electrical and electronic computers was given great impetus by the necessity for reducing the time and manpower required to solve very complex and tedious mathematical equations for use in research and engineering design. As is usually the case in such a development, the first such computers were designed and built to be of a highly generalized nature so that they could be used in as many and as complex mathematical computations as possible.

Very much more recently there has been a new development in application of computers, namely, that of introducing the computer directly into the feedback control loop of a process plant as an actual operating instrument working in conjunction with the controllers.

Converters . . . The computer through its scanning system can then take the data directly from the plant, which certainly in the beginning will be from

"6000 Horses" For Heavy-Duty Drilling



Here, lined up for delivery, are six D-1000-A Emsco slush pumps, your biggest oil field value. With 1000 horsepower maximum input capacity, the heavy duty, D-1000-A features exposed fluid liner construction, heavy duty roller bearings throughout, and special alloy fluid end.

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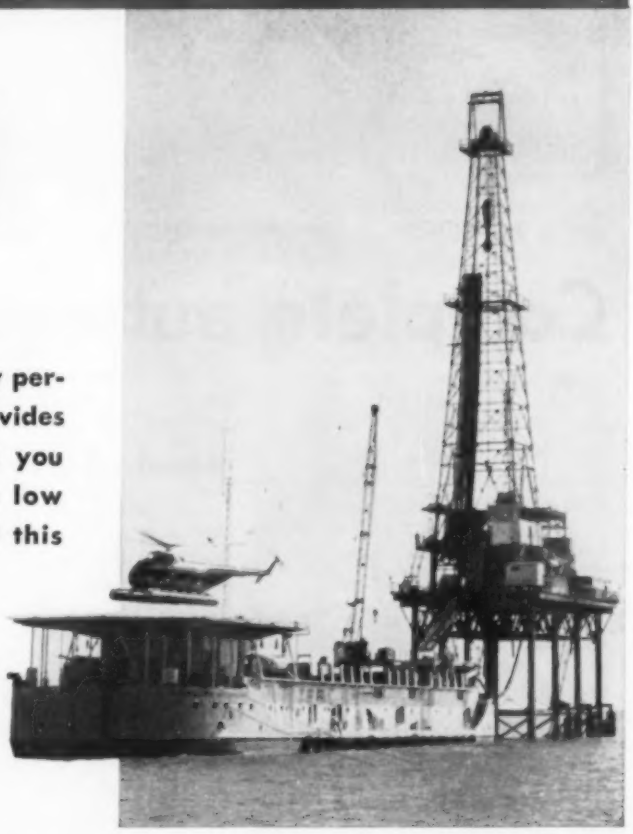

Designed and built for extra heavy-duty performance, the D-1000-A slush pump provides the high fluid pressures and volumes you need for deep hole jet drilling. The low weight high performance feature of this pump is made possible by Emsco's fabriform construction. Like all Emsco slush pumps, the D-1000-A is dependable, economical, and easy to maintain. Let your Mid-Continent representative show you how this Emsco pump performs on the deepest holes.

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the existing analog instruments in the orthodox system, by way of analog to digital converters (Fig. 2). Suitable programing causes this information to be put into the computer in proper sequence to be utilized in the appropriate one of the mathematical procedures.

The computer will then automatically carry out the computation to determine the efficiency or any other criterion of operation of the unit which is related to its optimum performance. Having determined this, it is actually comparing the short-term operation with the intended design.

Having done this, it may issue signals which will be sent to the controllers to change their preset values toward a more optimum condition for cost, product quality, or any other criterion which may be included in the computer's instructions.

Cost Calculations

The most important feature of introduction of the computer into the control loop is that its instructions may also include the cost equation for the units under consideration or the entire plant. Thus, the plant may be made to approach the optimum cost for the materials being processed and the operating expenses involved by repeated checking by the computer and setting up new conditions more closely approaching the optimum.

The computer may then be said to be actually "redesigning" the plant each time it goes through a scanning, computation and control cycle.

As a result of this, it may direct signals to do such things as the following: change the feed point to fractionators; increase or decrease the heat to reboilers; raise or lower the reflux rate; dictate the changing of catalysts in a fixed-bed operation; raise the temperature or increase the flow rate to secure more favorable heat-transfer conditions in exchangers; dictate the optimum time to clean exchangers when the transfer rate has become so low as to make it uneconomical to correct the condition by other means.

There are a great many such "decisions" which can be made simply and very rapidly by the digital computer.

Operator functions . . . Thus we have introduced into the control system a step which performs the same functions as when the operator gathered data from the orthodox system, tabulated it, studied it, had process calculations made, studied these results and set up a new series of preset conditions. However, the computer, when receiving its information directly from the process and feeding back its decisions directly to the control system, would accomplish one of these series of performances in a matter of seconds as compared with hours or days for the manual procedure.

". . . instructions may also include the cost equation for the units under consideration or the entire plant . . . The computer may then be said to be actually 'redesigning' the plant each time it goes through a scanning, computation, and control cycle."

An entirely new procedure is that of including the cost equation in the computations, giving an opportunity to optimize the cost of the operation. Such in-line computers are now being applied in this general manner. One has been recently described which is especially designed for process-control work and which already is being installed in a process involving some of the unit operations.[3]

Good results . . . In thus applying computers, one frequently finds some very spectacular results. For example, a test was made on a mixing problem involving some 41 possible components of a mixture, trying to make a blend of not more than 8 raw materials, each having a different cost and each containing components of all of the 8 variables to produce a fixed composition with respect to all 8 variables.

Low cost of the final mixture was desired. This meant solving a system of 41 simultaneous equations. Manual calculations at the rate of 1 calculation each 10 seconds would require one man working steadily, without interruption, approximately 100 weeks, or 2 years of time.

Obviously, such a schedule would be impossible and the actual time would be about 6 years. One of the present-day process-type computers[3] would do these same calculations in approximately 2 hours.

With the present-day orthodox system the controllers, when operating properly, will bring the conditions of operation back to the preset values if it is at all possible for such values to be achieved. The orthodox system is based upon the principle that it will operate by comparison and adjustment to preset conditions. Thus each instrument may be considered to be a single and elementary form of analog computer, designed in accordance with this principle of return to preset conditions. However, it would still be necessary for the operator to, in effect, break into the feedback loop and introduce his own judgment and decisions into the instrumentation if he wanted to change the conditions and cause the process to operate at some other preset arrangement of values.

Optimizing the process . . . To optimize the operation of the process in any respect under the old manual system or the present orthodox system, it is necessary to withdraw data from the system, make a series of calculations to find a better approach to the optimum set of operating conditions, communicate these to the operator and have him set them into the instruments as preset points. Usually this is very time consuming and costly.

It is never possible to make enough sets of calculations to find the absolute optimum conditions. Thus this procedure, if adopted at all, is used in a very sketchy and superficial manner as compared with the ultimate which is theoretically possible.

The optimum conditions are never known and the plant seldom operates on such conditions but is caused to drift around these conditions in an attempt to strike a satisfactory average as far as product quality is concerned.

Obviously cost of production can never truly be optimized unless these deviations are minimized.

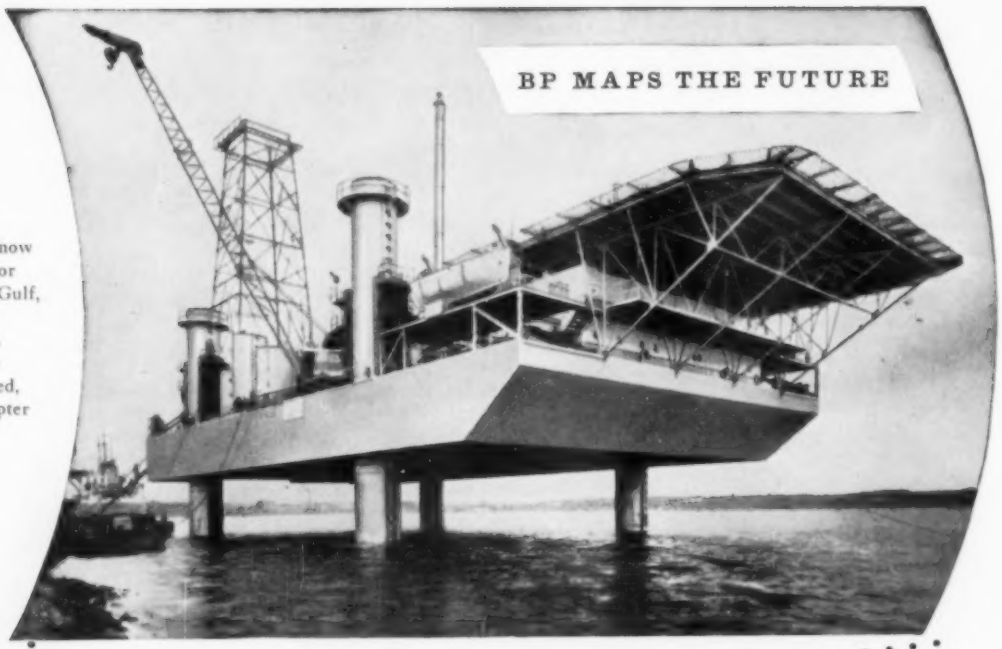
Types of Computers

One may well question the reasons for having thus far assumed the use of a digital computer for this in-line operation. There is, of course, another general class of computer known as the analog computer.[4] This instrument has great utility in the systems we have been talking about.

However, when we consider its characteristics, we will appreciate why the digital computer will probably become the most useful and practical equipment. Analog computers utilize natural processes to stimulate the mathematical operation which is to be carried out. For example, analogies of many computations carried out in chemical engineering procedures can be accomplished by an electrical simulator which employs Ohm's law.

A nice application of this is where a specialized analog computer can be set up to simulate flash calculations. In effect, analog computers are models of the system for which they make computations. Hence they are limited to handling mathematics which are applicable to the particular

BP MAPS THE FUTURE



This underwater drilling barge has now commenced work for BP in the Persian Gulf, 80 miles from the Arabian mainland. The legs retract to enable it to be towed, and it has a helicopter landing platform.

Can oil supplies be doubled in the next ten years?

TODAY THE WORLD is using twice as much oil as in 1946. So far, production has kept pace with demand. At its expected rate of increase, by 1966 demand may well have doubled again. What is being done to meet this situation?

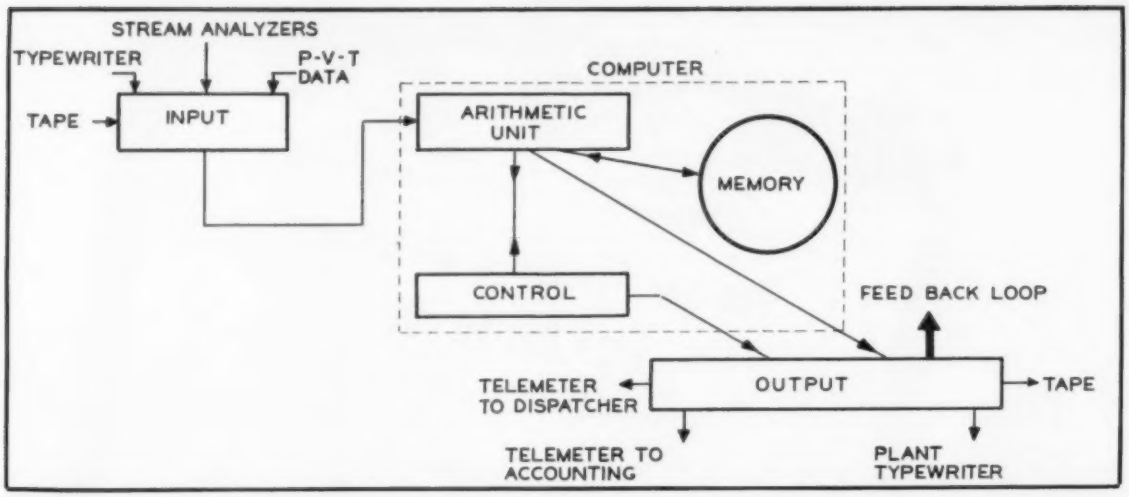
The answer is that exploration in known and suspected oil-bearing areas is proceeding on a colossal scale. In this world-wide operation the BP Group of Companies and its Associates are engaged, in some twenty countries, at an investment cost running into millions of dollars.

BP is also increasing the capacity of its fourteen refineries; adding new vessels to its 2,000,000-ton tanker fleet; expanding its marketing system, which already covers a great sweep of the globe, from Canada through Europe to Asia, to New Zealand. In 1946 the world used a hundred and fifty million barrels of BP products; in 1956 four hundred million.

The ever-increasing demand for oil must be met: no organisation in the world is working harder to meet it than The British Petroleum Company.

THE *British Petroleum* COMPANY LIMITED

BP



COMPUTER takes data directly from plant in proper sequence to be used in the appropriate mathematical procedure. The computer will then automatically carry out the computation to compare the short-term operation with the intended design, and signal controllers to make necessary corrections.

model for which they were designed.

Another limitation is that a high degree of accuracy is not usually possible with this type of equipment, since it is inherent that the accuracy is limited by the physical characteristics of its components.

Digital is versatile . . . By contrast, the digital computer is much more versatile because it is capable of accepting any arrangements of instructions in any system of mathematics within the limits of its capacity and speed. Its instructions and even its entire program can be very rapidly changed by merely erasing either partially or wholly the old instructions contained in its memory, and introducing an entirely different set of instructions.

Furthermore, the digital computer has the inherent property of being capable of almost any desired degree of accuracy, depending upon the complexity of circuitry which is permissible.

Computer in Instrumentation

In general we have a very broad field of practical application of computers in such military fields as missile design, guidance and other applications to draw upon for background in the design of computers of high capacity, very great speed, small size, ruggedness, and over-all reliability. Particularly with the digital computer, there is little if any fundamental difference, to the computer itself, in handling chemical engineering calculations or performing calculations in any of the above highly unrelated fields.

The orthodox system of instrumentation has up until recently been essentially a P-V-T type of system. That is to say, practically all processes have been controlled by setting the pressure, temperature, and flow (or volume) conditions within the process to maintain its operation in such a manner as to produce products of fixed specifications. This is done upon the principle that fixing the above physical conditions will produce a known and fixed chemical composition of materials either in the intermediate stages or in the product.

Frequently, these same essential variables can be related to the quality and cost of the products. In many instances the computer can be programed to take into account these relationships which are usually derived from a study of the operation and arriving at mathematical relationships for the process which may be introduced into the computer as instructions.

Particularly in the case of existing plants where operating data can be secured from long periods of performance, this is a good approach and involves little more than the existing orthodox instrument system which is coordinated with the computer through analog to digital converters for its inputs, and digital to analog converters to place its outputs back into the control loop.

With the very rapid development of stream analyzers such as infrared, ultraviolet and mass spectrographs, chromatographs, and similar instruments, it is possible to provide the computer with data which have heretofore been unavailable on a continuous basis from the process itself. This makes it possible to utilize actual chemical analyses which in many cases may be a more specific kind of information for use in optimizing the process.

This is particularly true when the composition of the streams being handled is extremely complex and involves many components. In some cases an attempt to apply the P-V-T variable type of control results in the discovery that a great many combinations of chemical composition can be found which will satisfy a given set of P-V-T values.

Hence the stream analyzer will on occasion become a very useful adjunct to computer control because it can supply the computer with chemical composition information which is ideal for use in the type of mathematics which the computer has the outstanding capability of handling.

Data logging . . . Thus far we have said little about data logging as a part of the control system under consideration. Actually the digital computer is ideally suited to function as a data logger simultaneously with its computing function. It must merely be supplied with a suitable electric typewriter and its instructions so constituted as to direct some of the results which it computes into the mechanism of the typewriter.

Thus, it is a rather simple step to have the computer present a log sheet on the typewriter setting forth any of the operating data on the plant which are desired for observation or recording. One very important function of this type is the ability of the computer to make hourly or daily summaries of operating information which is of importance to supervisory personnel, accounting departments, and management.

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  Potency maintained even when in contact with certain metals (copper, brass, iron and some alloys)
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*D*av-Ad 101 is available in 100-pound fiber drums . . . Dav-Ad 102 (in toluene) in 55-gallon steel drums containing 400 pounds net, or in tank car lots. Stocks are located in Baltimore, Md., Lake Charles, La. and Cincinnati, Ohio for your convenience.

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Such summaries can be made very rapidly and presented on the typewriter in almost any form of tabulation which is desired.

Other potentialities . . . In the future it is to be expected that computers will be the stepping stone to the handling and transmission of a great variety of information other than that involved in the control of the process itself. With the ability of the computer and its attendant typewriter to log and tabulate information from the process, it is a simple step to add other typewriters at remote locations, e.g., at dispatchers' offices, in accounting offices, or in management centers, where the same information is simultaneously presented with that which is being typed in the control room.

Transmission of such signals by wire line or radio would be no different than that which is already accomplished on teletype circuits. An interesting possibility is the ability of such systems to punch tape or otherwise introduce the data directly into the accounting-department business-machine computers and thus eliminate all transfer of such information by paper and cause it to be delivered almost instantly to the accounting center.

Special Considerations

The computer as an in-line control instrument introduces the concept of "redesigning" the operating unit on a short term and very rapid basis. It also permits the introduction of the cost equation into the control system. Thus we have the possibility of much greater flexibility in the process to optimize it costwise or from a standpoint of product quality. This should ultimately have a great effect upon the design of process plants.

One of these effects may be a tendency toward designs which permit a greater range of operation with respect to feed stocks and products to be produced. It should make much easier the problem of handling multiple feed stocks from different sources where they might vary greatly in quantity and quality. Future designs may therefore be purposely broadened to permit the computer to have greater latitude in "redesigning" the process during operation.

Another area which must be given careful attention with the advent of this rapid control system is that involved in sampling. In the past we have given little consideration to high-speed sampling and the necessary characteristics which it must have to insure adequate representative samples.

"In the future it is to be expected that computers will be the stepping stone to the handling and transmission of a great variety of information other than that involved in the control of the process itself."

This is particularly true with respect to stream analyzers. Under the old orthodox systems of manual or closed-shop control where chemical analyses are done in laboratories, samples are frequently taken upon a composite basis over long periods of time. It becomes obvious that if a short time sample is to be meaningful to the computer system, it must be taken with extreme care to represent the composition of the stream and the quantity which is involved during the short period for which it is useful.

A whole new field of the mathematics of sampling should be developed in the course of application of these more sophisticated automatic systems.

Economics

True computer control will be most suited economically to the more complex and large-scale processes. In most cases the economic advantages will not be apparent if such control were to be applied to a single process unit such as an individual fractionator, absorber, or other unit operation. Neither will it be applicable, in most cases, to the unit of small throughput unless this be a product of high unit value.

When a process or unit operation within a plant is handling large volumes of raw materials and products and the product specifications are stringent, computer control will demonstrate its greatest value. In such cases product quality and cost are usually related in complex ways. The deviations in quality each side of the average usually represent costs of appreciable magnitude.

The process-control computer, being capable of rapidly handling the complex mathematics involved, can reduce the amplitude of the deviations. Simultaneously costs are reduced at no expense to quality. In process units of large throughput these savings in incremental costs add up to large sums over relatively short periods of time and justify what may at first appear to be a rather high lump-sum cost of the computer control system.

Examples have shown that, for some plants having a capital investment in the 10 million-dollar range, an additional investment of 2 to 4% in a computer and related equipment is readily justified on a payout basis which is quite normal in the petroleum and allied industries. This is only for process control within the operating unit.

The savings in money and time involved in additional benefits, such as rapid handling of accounting data and dispatching information, will certainly be of equivalent value in most instances. These have not yet been evaluated for any particular case.

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OPERATION OF COMPRESSORS—PART 5

The FOREMAN'S PAGE

Here are 28 steps for

Starting, stopping, and loading compressors

AFTER compressor lines are filled with gas to be handled and disconnect switch is closed, the following operating procedure should be followed, to start electric-motor-driven compressors:

1. Start motor-room ventilating system, if furnished, and slip ring ventilating system, if furnished, and check to make sure air and/or inert gas is flowing.
2. Check compressor to make certain that it is unloaded, and if it is not, unload it, observing precautions.
3. Make sure all compressor cylinders, suction piping and discharge piping are drained and free of condensed liquids or water.
4. Turn on cooling water.
5. Start motor generator-exciter set if furnished.
6. Start compressor motor and bring up to speed as per manufacturer's instruction book.
7. Apply compressor load.

Stopping Of Compressors

To stop gas-engine-driven compressors:

1. Unload compressor.
2. Idle engine with full-rate cooling-water circulation for 15 minutes.
3. Close fuel-gas dial cock.
4. When engine has used up fuel gas in manifold and has stopped, close block valve in fuel-gas line.
5. Make sure that drain between starting air cock and engine is open while engine is shut down.
6. Turn ignition switch to off position.
7. After engine has stopped, allow water to continue to circulate for at least 5 minutes. It is not desirable to ever shut off water except to work on engine or to prevent freezing during shutdown.

To stop gas-engine-driven compressors . . .

The most important step in shutting the engine down is to shut it down by closing off the fuel-gas line rather than cutting out the ignition. This prevents combustible mixtures remaining in the cylinders or exhaust system. In the event a compressor kicks off or stops running because of overload or some other reason, a combustible mixture will remain in the power cylinder. Be sure to roll the engine over several times with the ignition off before starting it again.

To stop electric-motor-driven compressors:

1. Unload compressor.
2. Stop the compressor motor as per manufacturer's instruction book.
3. Stop motor generator-exciter set if furnished.
4. After compressor is stopped, shut off cooling water.
5. Permit ventilating systems to operate until motor is cool. The ventilating systems may then be shut off provided there are no other electric motors operating in the same room.

Loading Of Compressors

Compressor equipped with hand-operated bypass . . . With compressor operating under power of its driver and with the driver adjusted to take full load, the steps to be followed in loading the compressor are:

1. Open discharge-block valve on high-pressure stage.
2. Gradually close bypass valve on high-pressure stage leaving cracked open.
3. Gradually open suction-block valve on high-pressure stage until almost open.
4. Complete closing bypass valve and simulataneously complete opening of suction block valve. Operation with suction and bypass-block valves closed and discharge-block valve open should be minimized to avoid pulling a vacuum on the suction side of cylinder with the attendant hazard of air leakage into cylinder.
5. Similarly load in sequence each next lower stage in the same manner as indicated in steps 1, 2, 3, and 4.

In processes in which suction pressures build up during a shutdown, such as refrigeration plants, step 3 will have to be varied to make sure that the pressures in the suction-pulsation bottles do not exceed the design operating pressures and the compressor may have to operate for a considerable period of time with suction-block valves pinched to allow the suction pressures to be gradually pulled down to the design pressures in order to prevent serious overloading of the engine.

Before rotating any compressor, all suction and discharge lines, bottles, and compressor cylinders should be drained.

Clearance pocket . . . For a compressor equipped with clearance pocket or suction valve unloaders, and operating under power of its driver and with the driver adjusted to take full load, the steps to be followed in loading the compressor are as follows:

1. Open discharge-block valve on high-pressure stage.
2. Open suction-block valve on high-pressure stage.
3. Similarly open discharge and suction-block valves in this order for each next lower stage.
4. Apply load by closing cylinder unloaders either through automatic controller where provided or, if manually, in capacity steps successively from high-pressure to lower-pressure stages.

Processes in which suction pressures build up during a shutdown, such as refrigeration plants, steps 2 and 3 will have to be varied that care must be taken to make sure that the pressures in the suction pulsation bottles do not exceed the design operating pressures and the compressor may have to operate for a considerable period of time with suction-block valves pinched to allow the suction pressures to be gradually pulled down to the design pressures in order to prevent serious overloading of the engine.

This material taken from process-training-program manual, Baton Rouge, La., refinery of Esso-Standard Oil Co.

RING OF STEEL

Defies Pressure Times Ten

The Flexitallic gasket in the bonnet joint of Hancock Steel Gate Valves cannot blow out even if pressures exceed ten times the rating of the valve. Valve maintenance and equipment down-time are greatly reduced. Made of a spiral-wound ribbon of stainless steel with asbestos filler, the gasket has spring-like compressibility – cannot be flattened.

Only the specially-designed Hancock bonnet joint with built-in compression limit can make full use of the positive sealing power of this ring of steel. Such advanced valve engineering is one example of total Hancock quality that assures trouble-free performance. Your nearby industrial supply distributor will gladly explain every economy feature of Hancock Steel Gate Valves. Phone him today.

Hancock 800# Steel Gate Valve, Type 950. Sizes: ¼" thru 2".

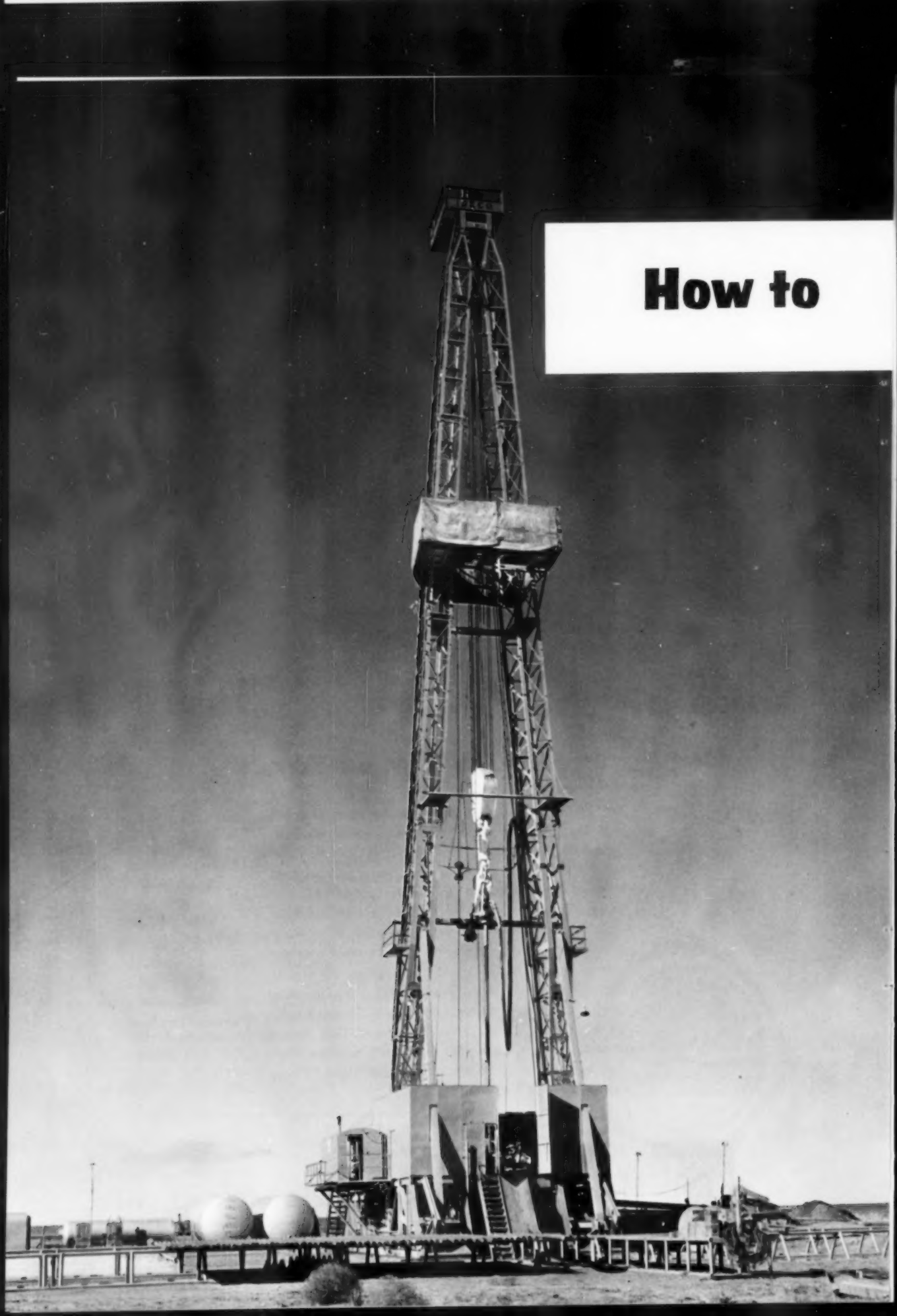
MANNING MAXWELL & MOORE INC. M&M TRADE MARK

HANCOCK STEEL VALVES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Watertown, Massachusetts
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario


How to

Drill with Speed and Economy

Foot by foot through any formation you're ahead with quality drilling equipment products from Jones & Laughlin Supply Division. Tough and trouble-free, they dig the world's deepest holes and speed the endless routine jobs that never make headlines. Supporting this quality line is J&L's brand of oil field service, delivering the materials you need when and where you want them.

Here's the best available for drilling with **speed** and **economy**:

Jones & Laughlin Drill Pipe... available in famous Blue Ribbon Vanadium grade for the really tough jobs.

Jones & Laughlin Wire Rope... a proven product supplying longer service life with less downtime.

Gardner-Denver Mud Pumps... set the standards while supplying the power it takes to punch a hole to pay... for profit.

Ideco Rigs... mechanical, electrical or Hydrair ... with the Full View mast.

Republic Rotary Hose... with the patented connection, the higher the pressure the tighter the seal.

For complete information on these and other oil field supplies contact your local J&L Supply Division man or write us direct, Drawer 2481, Tulsa.

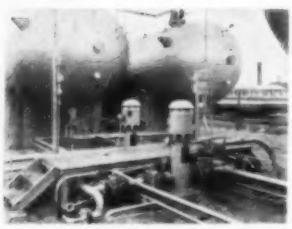
Jones & Laughlin

SUPPLY DIVISION – Tulsa

If it's sold by J&L....
it's the best available

to quench a big thirst–

PEERLESS PUMPS



"Fill it up!" and nearly 60 million automobiles take an annual 56 billion gallon drink. Helping to "set 'em up again" for aircraft, automobiles, L-P gas and diesel engines, virtually every type transportation, is the Peerless Hydro-Line® vertical pump. Available in two basic types, process and transfer, the Peerless Hydro-Line is serving in the handling of hydrocarbons such as gasoline, butane, propane, hot oils, etc.; hot or cold water; mild acids, basic and salt solutions. This flexibility of application, plus its space-saving vertical design, its outstanding NPSH (net positive suction head) characteristics and its ready adaptability to future system requirements, has made the Peerless Hydro-Line truly one of America's most versatile pumps. For complete information on the Peerless Hydro-Line vertical pump line, write for Bulletin No. B-1700.

Putting Ideas to Work

fmc
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On the Job

IN THE FIELDS

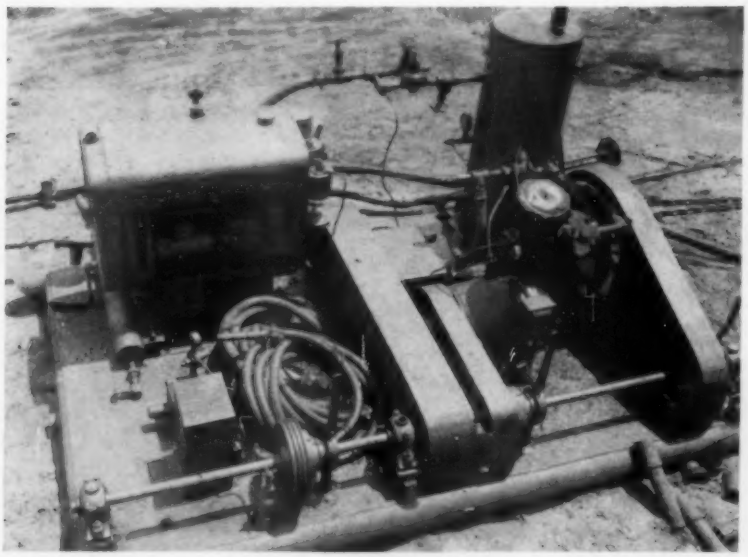
Texans use these tricks of the trade . . .

In Orange County...

IN THE ORANGEFIELD field of Orange County, Texas, the Texcan Oil Co. uses this dock for handling large tools and material for their operations.

Built in the form of a W, the trucks can be backed in between the docks and the material easily loaded. In the center of the W, a swinging boom is fastened which consists of a piece of 5⅞-in. casing cemented in the ground with a piece of 4-in. drill pipe stuck inside with a 4-in. cantilever beam on the top.

A hand winch is used to raise the tools so that they can easily be swung around.



In Liberty County...

THIS skid-mounted unit working for Oil Production Maintenance Co. in the South Dayton field, Liberty County, Texas., has a neat hookup for providing air, electricity and water pressure using one engine and a line shaft.

The shaft is placed along one side of the skid base and the engine and compressor on the other side. This makes a convenient distance for the V-belts to operate in. The generator and the water pump (not installed at present) set on the inside of the base where they take up very little space.

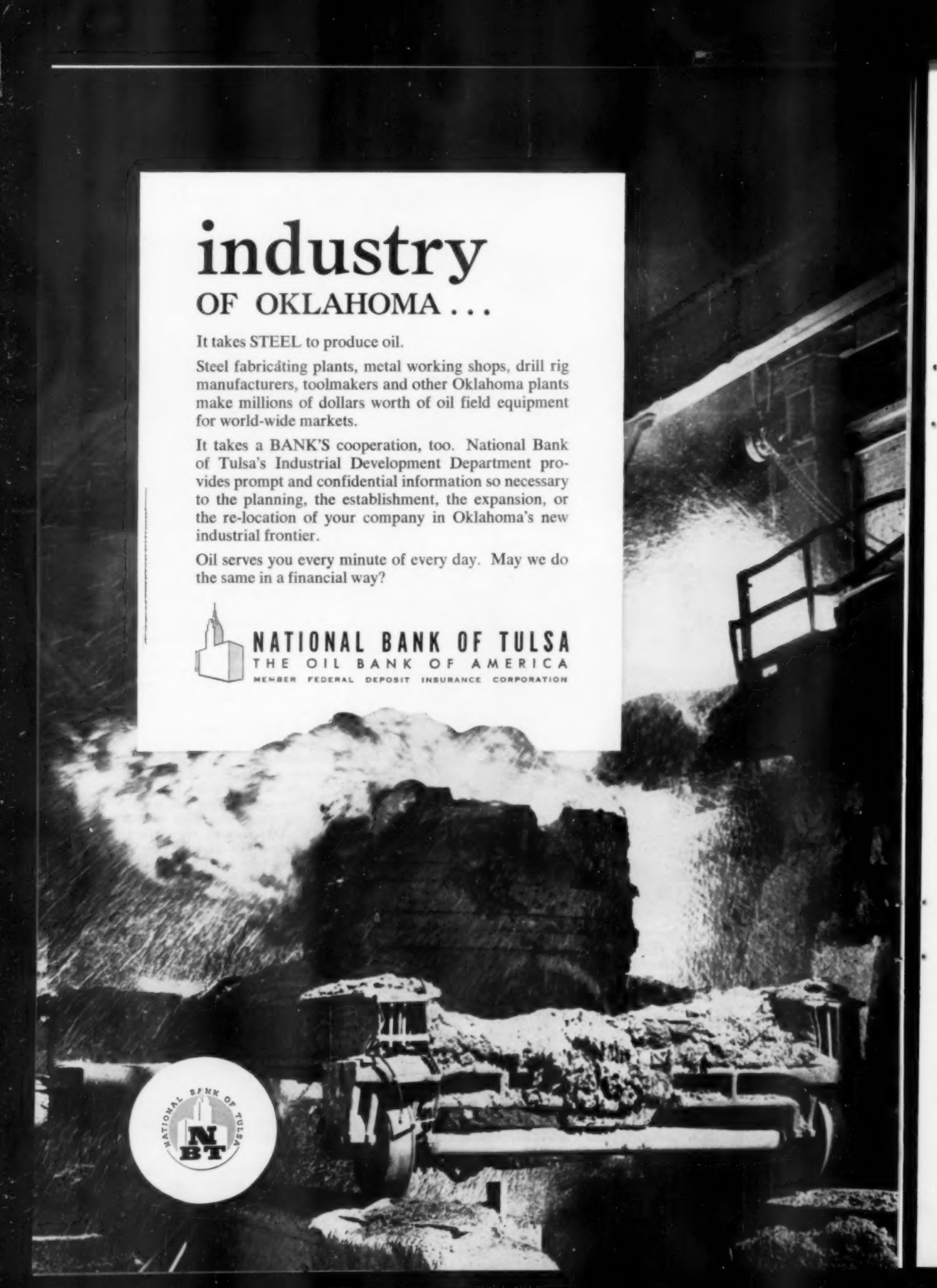
A clutch on each of the V-belt pulleys allows any or all of the units to be engaged or disengaged as necessary for work around the workover rig.

And in Houston

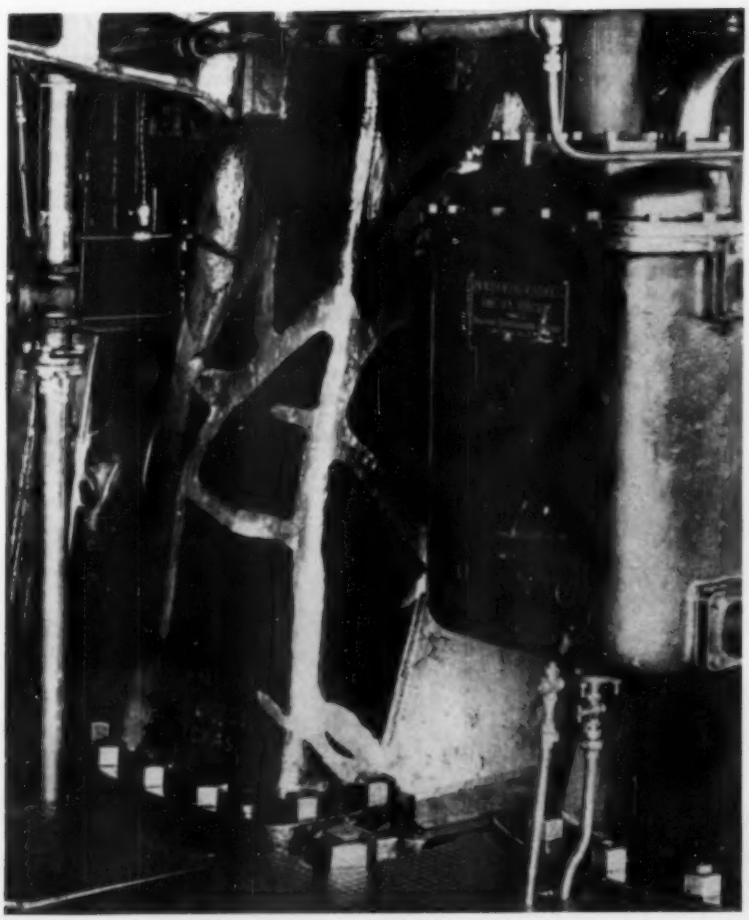
THESE BINS are built by Carl Martin Oil Well Service of Houston into the side of its service truck to carry hand tools and materials.

The compartment is nothing but a large box built into the space behind the cab so that it is just within the legal load limits. A large drawer placed on rollers pulls out to make a tray for the rod wrenches, and other tools, and the door lays down to make a tray for holding the material while the well is being worked on.

When the drawer is pushed in, the door is raised and closes over it, making a tight, weatherproof, thiefproof tool box.


industry
OF OKLAHOMA . . .
It takes STEEL to produce oil.
Steel fabricating plants, metal working shops, drill rig manufacturers, toolmakers and other Oklahoma plants make millions of dollars worth of oil field equipment for world-wide markets.
It takes a BANK'S cooperation, too. National Bank of Tulsa's Industrial Development Department provides prompt and confidential information so necessary to the planning, the establishment, the expansion, or the re-location of your company in Oklahoma's new industrial frontier.
Oil serves you every minute of every day. May we do the same in a financial way?
NATIONAL BANK OF TULSA
THE OIL BANK OF AMERICA
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION
NATIONAL BANK OF TULSA
NBT

A wrecked diesel engine—and no replacements



. . . but braze-welding fixed it up

WHEN the crankshaft in a 1,200-hp. diesel engine broke, it caused breaks in the cylinder, A-frame, and the crankshaft base.

There were no replacement parts available, so a team of welders set to work to try to patch up the equipment with braze-welding.

Two and one-half months later, the wrecked diesel engine was repaired and ready for service.

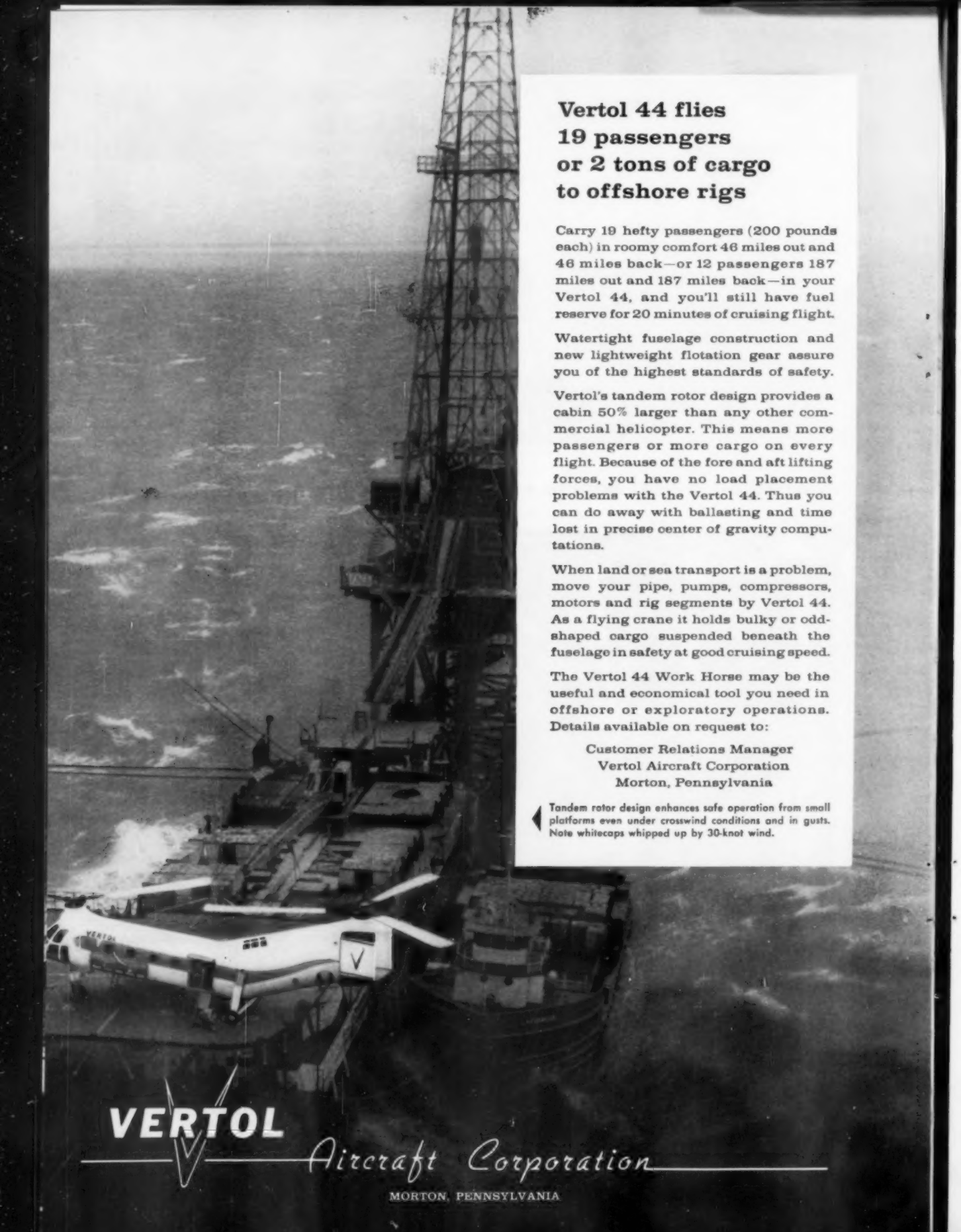
After the bronze weld metal is used, the deposit was ground down to original surface. This meant that there was a reinforcing bronze metal on the completed job. In grinding off this excess, a thin surface of bronze deposit is removed.

This deposit is brittle and apt to cause trouble in the future if left intact. During the welding, the operators welded only short distances that could be handled easily.

The operators adhered to normal safety practices. Atmospheric gas tests were made to determine the composition of the air around the welding area. Fireproof screens, to prevent sparks from reaching nearby locations, were erected. Provisions are made for fire-extinguishing equipment.

On some jobs like these, the welders do away with preheating, controlling stresses by using the proper welding procedure, being especially careful to have as nearly perfect a bond as possible, spending the necessary amount of time on each square inch of weld.

Reprinted from Linde Tips, Vol. 34.



Vertol 44 flies 19 passengers or 2 tons of cargo to offshore rigs

Carry 19 hefty passengers (200 pounds each) in roomy comfort 46 miles out and 46 miles back—or 12 passengers 187 miles out and 187 miles back—in your Vertol 44, and you'll still have fuel reserve for 20 minutes of cruising flight.

Watertight fuselage construction and new lightweight flotation gear assure you of the highest standards of safety.

Vertol's tandem rotor design provides a cabin 50% larger than any other commercial helicopter. This means more passengers or more cargo on every flight. Because of the fore and aft lifting forces, you have no load placement problems with the Vertol 44. Thus you can do away with ballasting and time lost in precise center of gravity computations.

When land or sea transport is a problem, move your pipe, pumps, compressors, motors and rig segments by Vertol 44. As a flying crane it holds bulky or odd-shaped cargo suspended beneath the fuselage in safety at good cruising speed.

The Vertol 44 Work Horse may be the useful and economical tool you need in offshore or exploratory operations. Details available on request to:

Customer Relations Manager
Vertol Aircraft Corporation
Morton, Pennsylvania

Tandem rotor design enhances safe operation from small platforms even under crosswind conditions and in gusts. Note whitecaps whipped up by 30-knot wind.

VERTOL Aircraft Corporation

MORTON, PENNSYLVANIA

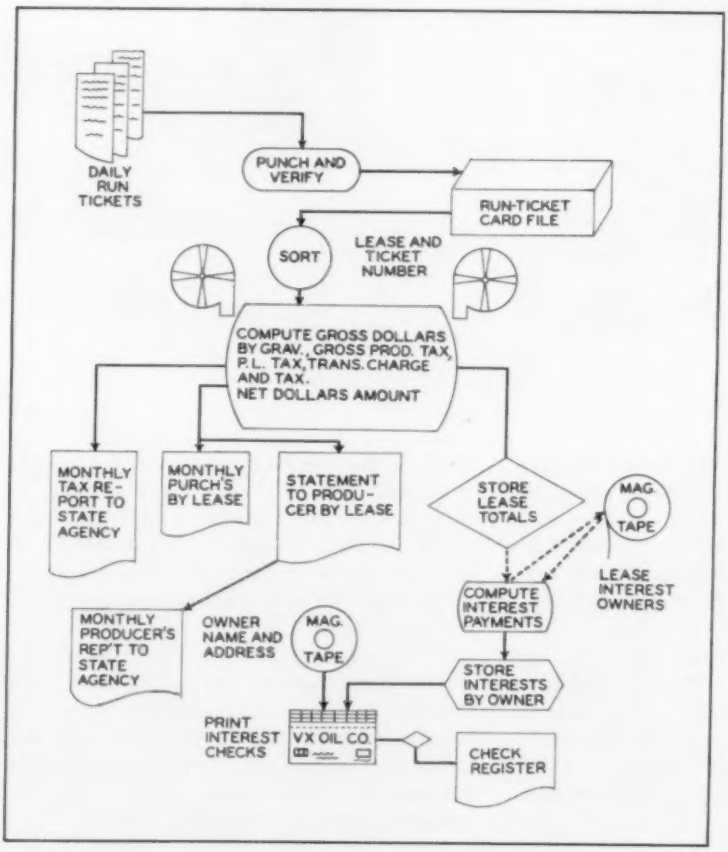
BY ANTHONY F. MAROTTA
The Datics Corp., Fort Worth

Headaches can be prevented by using . . .

Electronic computors for accounting

"I am an oil purchaser. In addition to buying crude oil I also purchase many, many bottles of aspirin each month. My accounting office lives on them. My office manager tells me that last month a woman recently employed in our office computed gross dollars using the run-ticket numbers as production! Oil production as it is today requires that I economize as much as possible. Aspirin is an expensive item—especially in large quantities. We now use fewer pencils, but I can't cut my aspirin expense! My question is, "What can I do to eliminate the need of these acetylsalicylic acid goof balls each month?"

Well, sir, I read an article not too long ago about the solution to a problem similar to yours. An electronic computer was used. Formerly, quite a few aspirin were being used around the end of the month. This consumption was due to the tremendous amount of work required in preparing and checking monthly reports.


DAILY RUN TICKETS
PUNCH AND VERIFY
RUN-TICKET CARD FILE
SORT
LEASE AND TICKET NUMBER
COMPUTE GROSS DOLLARS BY GRAV., GROSS PROD. TAX, P.L. TAX, TRANS. CHARGE AND TAX. NET DOLLARS AMOUNT
MONTHLY TAX REPORT TO STATE AGENCY
MONTHLY PURCH'S BY LEASE
STATEMENT TO PRODUCER BY LEASE
STORE LEASE TOTALS
MAG. TAPE
LEASE INTEREST OWNERS
COMPUTE INTEREST PAYMENTS
MONTHLY PRODUCER'S REP'T TO STATE AGENCY
OWNER NAME AND ADDRESS
MAG. TAPE
STORE INTERESTS BY OWNER
PRINT INTEREST CHECKS
VX OIL CO.
CHECK REGISTER

HERE is how computer will be used by oil purchaser. Fig. 1.

THE NO-ASPIRIN METHOD works like this:

Information recorded on daily run tickets is transferred to punched cards. These transferred data are, namely, ticket number, date, lease identification, opening and closing gage readings (or actual volumes), and gravity.

These cards are placed in a file until the end of the month unless the volume of data warrants daily processing. When all the runs for the month have been recorded, the card file is processed in one of those new "electronic brains."

Gross barrels are computed based on gage readings applied against tank tables divided into ¼-in. segments. These tables may be stored internally in the memory of the machine if sufficient capacity exists.[1] Otherwise, curve-fitted constants may be used to reproduce portions of the table as required.[2]

Gravity corrections are introduced by means of the ASTM method.[3] This temperature-volume correction is computed using the expression:

$$M_t = 1 + a\,(t - 60) + b\,(t - 60)^2$$

where t is the oil temperature and a and b are coefficients chosen from the table corresponding to 60°-gravity oil.

Net barrels are computed by applying the gravity correction and adjusting for b.s. and w. The price schedule per barrel based on gravity is applied to the net barrels to obtain total gross value for each lease. The gross value is adjusted by all the miscellaneous taxes and charges relative to the lease to give a net dollar amount.

Total net value for each lease is then divided among the interest owners.

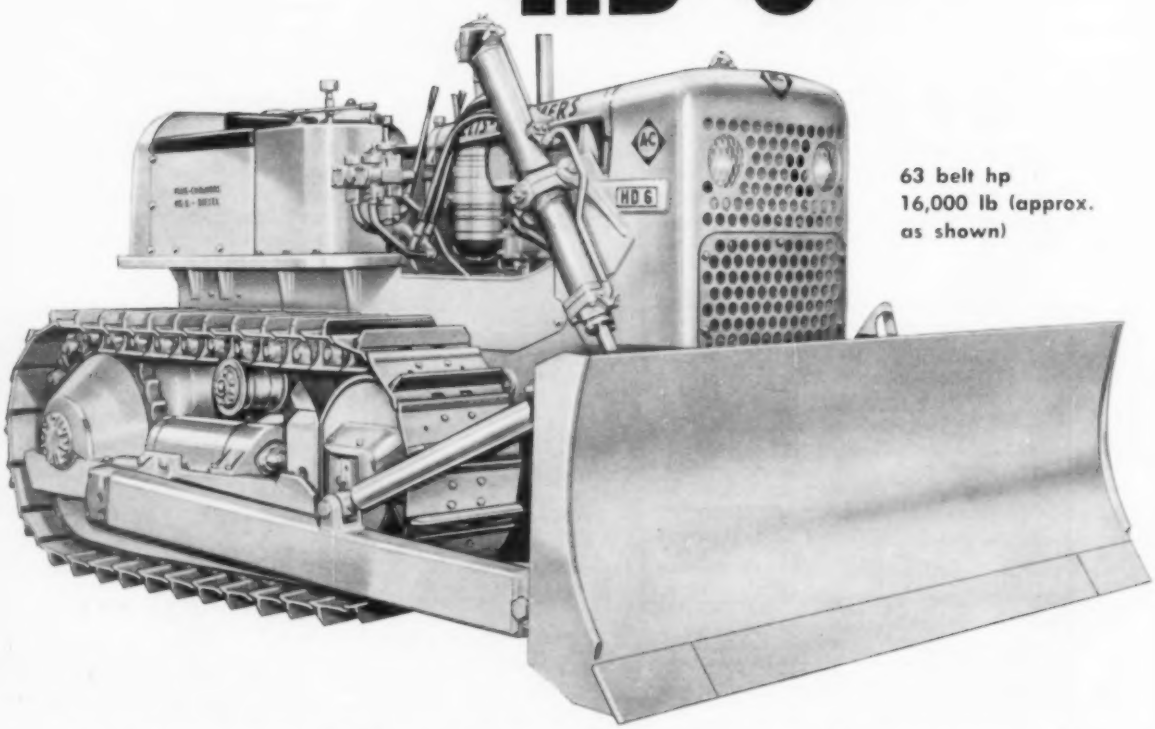
References

1. Spinning, H. M., Shell Oil Co.
2. McIntire, R. L., PETROdatics No. 17, The Oil and Gas Journal, August 26, 1957.
3. ASTM-IP Table 7.

POWER for the job

PORTABLE without a permit

ALLIS-CHALMERS HD-6 Dozer



63 belt hp
16,000 lb (approx. as shown)

Oil field contractors find the Allis-Chalmers HD-6 measures up — both in performance and easy transport. It has the size, power and dependability to make money on oil field jobs — digging slush pits, building lease roads and fire walls, leveling drill sites, moving oil field equipment and supplies.

When traveling from job to job, there's no need to remove the dozer. The 8-ft blade — legal width for highway travel — lets you load your HD-6 right onto a truck or trailer — travel quickly with no time lost.

The HD-6 is a maintenance man's tractor. Even in the mud and corrosive brine of the oil fields, Allis-Chalmers Positive Seals protect tapered roller bearings on truck wheels, idlers and support rollers. These smooth-running assemblies require lubrication only once every 1,000 hours — change greasing time to profitable work time.

There are many reasons why more and more oil field contractors are using HD-6 dozer tractors. See your Allis-Chalmers dealer. He'll be glad to demonstrate on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Look ahead... *move ahead* ...and stay ahead with **ALLIS-CHALMERS**

BY W. L. NELSON
Technical Editor and
Petroleum Consultant

Questions on TECHNOLOGY

Cost of fractionator systems

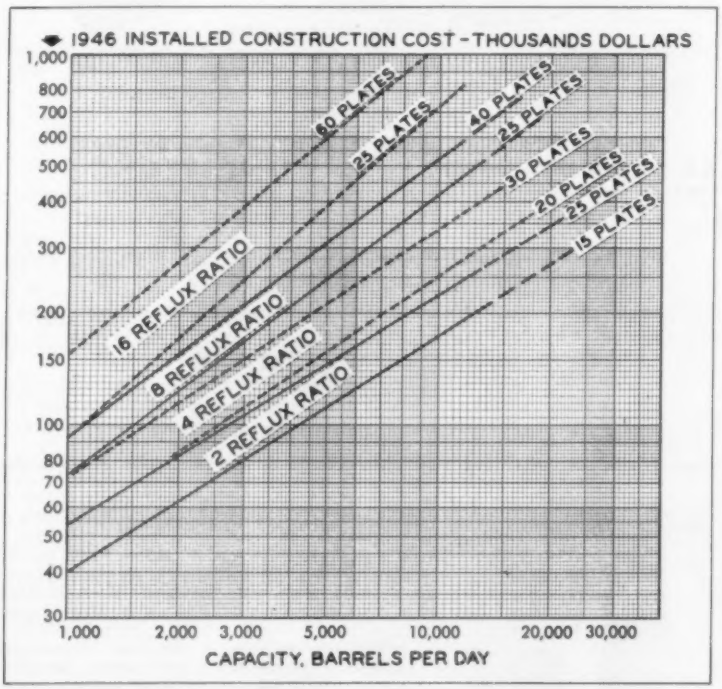
Your Costimating Series of 1957 shows the cost of many plants but I see nothing of debutanizers, hydrocarbon fractionators, etc. Can you suggest the cost of such plants?—R. Wm. T.

The plant costs shown in the Costimating Series (Numbers 26-30, March-May 1957) are actual plants costs published in the news literature. Fractionation-type distillation units were not included because refiners include such equipment along with other equipment and hence only a few news releases appear in the literature.

Accordingly, the costs of such plants were estimated and they are shown in Fig. 1. The estimated costs (Fig. 1) in some ways are not as satisfactory as published information, but at least they are consistent with themselves. The decrease in cost with increasing size that is evident in Fig. 1 is greater than we usually encounter. This probably occurs because cost estimators cannot account for the higher costs paid for large units by major refinery operators. The costs of Fig. 1 should probably be higher in the large-capacity ranges.

Conventional complete fractionation systems were contemplated in Fig. 1, composed of a fractionator, reflux drum, all heat added by means of a reboiler, a bottoms product exchanger and cooler, reflux and product condenser, a pressure of 120 psia., complete instrumentation, and overhead (profit, etc.) costs as outlined in Costimating No. 4. (OGJ, Jan. 6, 1956).

Costs may be brought to date using the Nelson Refinery Construction Cost Index that appears in the first issues each month of The Oil and Gas Journal. Thus, the costs of Fig. 1 serve as an approximation for depropanizers, debutanizers, stabilizers, hydrocarbon fractionators, solvent fractionators, etc. In fractionating high-boiling oils in large capacity units, it is necessary to add the cost of pipe-still heaters for supplying heat to the feed stock and the reboiler.



APPROXIMATE COSTS (1946) of reboiler-type single-tower fractionation plants. Fig. 1.

Reflux ratio is an all-powerful factor. It increases the size of the reboiler, reflux condenser, tower, and pumps, almost directly in proportion to the reflux ratio. However, as more and more reflux is used, it is also economical to use more and more plates in the fractionator. An attempt has been made to incorporate this variable in Fig. 1. Pressure is not a very powerful variable except at extremes of 350 psig. and higher, but the costs of Fig. 1 will be larger for high pressures (220 psig. and up) operations. Another variable that is very important is the percentage of material that is recovered as an overhead product nor could this variable be introduced in Fig. 1. The computations underlying Fig. 1 contemplate 25% of overhead product, and if the amount had been 50%, the cost of the plants would have approached double the values shown or at 75%, three times the cost.

Multitower systems . . . Two products can be produced with one tower, but an additional tower is required for each additional product. The extra tower and its auxiliary equipment is somewhat cheaper because fewer pumps and exchangers are required, but the cost is not much less:

	Approx.
1,000 B/D plant	$10,000
5,000 B/D plant	20,000
10,000 B/D plant	30,000
20,000 B/D plant	40,000

These reductions should be subtracted from the costs of Fig. 1.

As an example, a 10,000-bbl. per day plant (4 reflux ratio, and 30 plates per tower) is to produce two overhead products (2,500 bbl. per day each) and a final 5,000 bbl. bottom product. Thus the two towers will handle 10,000 and 7,500 bbl. per day. The cost (1946) of the system will be somewhat as follows (see Fig. 1):

First tower (10,000 B/D)	$335,000
Second tower (7,500 B/D) 275,000—25,000	= 250,000
Total	= $585,000

Obviously all sorts of combinations are possible.

The costs of topping and vacuum plants have been published in Costimating No. 26. (OGJ, Mar. 11, 1957).

TAKE A CLOSE LOOK . . .

. . . AT A REAL CASING SEAL

The ***NEW***

WmSEAL "Z" BUSHING

FOR BIG-INCH PIPELINES IN STANDARD OR OVERSIZE CASINGS

NEW ELONGATED LIP
TWICE AS LONG . . . TWICE AS FLEXIBLE (See fig. 1 & 2)

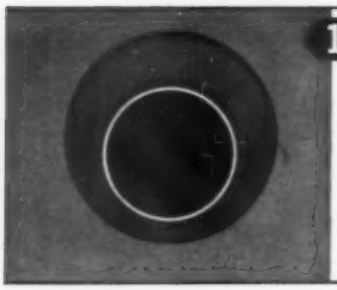
STAINLESS STEEL BAND, ANCHORED SECURELY BY S. S. CLAMPS

STAYS PUT ON CASING
NON-SKID TEETH AND EXTRA LONG GRIPPING AREA ANCHORS BUSHING SECURELY

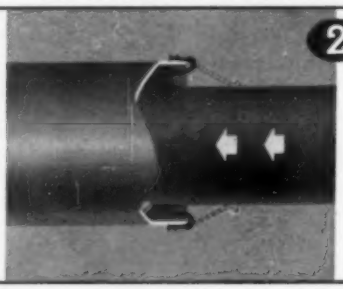
PUNCTURE PROOF
EXTRA THICK SHOULDER (BUNA-S SYNTHETIC RUBBER) PREVENTS CASING EDGE FROM CUTTING THROUGH BUSHING

NO SHIELD REQUIRED
THICKER FLEXIBLE "LIP" ELIMINATES NEED FOR SHIELD. WITHSTANDS WEIGHT OF BACK-FILL EARTH

A TIGHT SEAL UNDER ADVERSE CONDITIONS



WHEN PIPE IS OFF CENTER . . .



WHEN ENDO MOVEMENT OCCURS

FOR PIPELINES IN SERVICE
IMPROVED WmSEAL SPLICED "Z" BUSHINGS ARE AVAILABLE

(Write for Literature)

T.D. Williamson, Inc.
P. O. BOX 4038 TULSA 9, OKLAHOMA

REPRESENTATIVES: HOUSTON • AMARILLO • PLAINFIELD, N. J. JOLIET, ILL. • JACKSON, MICH. • LOS ANGELES • SAN FRANCISCO BARTLESVILLE, OKLAHOMA • SEATTLE • SALT LAKE CITY • EDMONTON TORONTO • VANCOUVER • BUENOS AIRES • CABIMAS, ZULIA, VENEZUELA • DURBAN, NATAL, S. AFRICA • PARIS, FRANCE • SIDNEY, AUST.

PIPELINE

CONSTRUCTION REPORT

Who's Laying Line—and Where

PIPELINE activity reported here is compiled from surveys conducted by The Oil and Gas Journal among pipeline companies and contracting firms. Projects listed include those proposed, contracted, and under way.

U.S. Crude-Oil Pipelines

• **Belle Fourche Pipeline Co.**
Project: 30 miles of 6-in. from Donkey Creek pool to Fiddler Creek pool in northeastern Wyo. Will later build a line from Fiddler Creek to connect with Butte Pipe Line Co. near Osage, Wyo.
Status: Planned.

• **Big Horn Pipeline Co.**
Project: 150-mile line from Ash Creek field, Sheridan County, Wyoming, to Midwest, Wyo.
Status: Pending Wyoming Public Service Commission approval.

• **Cape Pipe Line Co.** (Sun Oil Co., Cities Service Co., Atlantic Refining Co.)
Project: Line from lower Delaware Bay to Philadelphia.
Status: Planned.
Completion: 1960.

• **Cooperative Refinery Association**
Project: 6 miles of 6-in. in Washington County, Oklahoma.
Completion: Mid-June 1958.

• **Gillette Pipeline, Inc.** and **A. W. Hartwig, Inc.**
Project: A 102-mile line from Dead Horse Creek field to Casper. Wyo.
Status: Has applied for permit from Wyoming Public Service Commission.

• **Great Northern Railway Co.**
Project: 400 to 600 miles of 12 to 20-in. from Williston basin in Montana and North Dakota, to Clearbrook or St. Paul, Minn.
Status: Planned.
Contractor: **Pipe Line Technologists, Inc.** has completed feasibility study.

• **Jayhawk Pipeline Corp.** (Colorado Oil & Gas Corp., National Cooperative Refinery Association)
Project: 197 miles of 12-in. from Meade to McPherson, Kans., and 42 miles of 10-in. from McPherson to Valley Center, Kans.
Status: Under way.
Contractor: **R. H. Fulton & Co.,** Lubbock, Tex.
Completion: September 1, 1958.

• **International Oil Pipeline Corp.**
Project: International would own U.S. section of 1,500-mile, 30-in. line proposed by Mid-Continent Pipe Lines, Ltd., from Edmonton to Chicago.
Status: Permit for Canadian section sought from Canadian Board of Transport Commissioners.

• **Kaycee Pipe Line Co.**
Project: Line from North Fork field to Midwest, Wyo.
Status: Pending Wyoming Public Service Commission approval.

• **Magnolia Petroleum Co.**
Project: 22 miles of 16-in. line offshore Louisiana, to move gas and condensate from West Cameron area.
Status: Under way.
Contractor: **Brown & Root, Inc.**
Completion: Fall 1958.

• **Offshore Gathering Corp.,** Houston.
Project: 364 miles of mostly 20-in. in Gulf of Mexico off Louisiana. (Dual line.)
Status: Proposed.

• **Service Pipe Line Co.**
Projeect: 30 miles of 12-in. from North Fork field, Wyoming, to the Salt Creek pump station.
Status: To start July 1, 1958, pending Wyoming Public Service Commission approval.
Project: 41 miles of 20-in. looping from Fort Laramie to Glendo Junction, Wyo., and 35 miles of 20-in. looping from Welch to connect with system at Casper, Wyo.
Status: Under way.
Contractor: **O. R. Burden Construction Corp.,** Floyd Lewis, supt.
Completion: Fall 1958.

• **Shell Oil Co.**
Project: 20 miles of 6-in. from Vallecitos field in eastern San Benito County to main Bakersfield-to-Martinez line in Fresno County, California.
Status: Planned.
Completion: Late July 1958.
Project: Undetermined mileage of 2, 3, and 4-in. flow lines in Mississippi River Delta area under 6-month contract.
Status: Under way.
Contractor: **Brown & Root, Inc.**
Completion: September 30, 1958.

• **Shell Pipe Line Corp.**
Project: 2 miles of 6-in., 11 miles of 8-in., 11 miles of 12-in., 29 miles of 16-in., and 64 miles of 20-in. from Mississippi River delta area to New Orleans refining area.
Status: Planned.
Contractor: **Coates Field Service, Inc.,** has right-of-way acquisition and claims settlement.
Completion: December 1958.

• **Sinclair Pipe Line Co.**
Project: 150 miles of 20-in. from Teague, Tex., to Houston.
Status: Under way.
Contractor: **Lone Star Constructors, Inc.** has 143 miles; **Golightly Construction Corp.** has 6 miles.
Completion: July 1, 1958.

• **Union Oil Co. of California**
Project: 1 mile of 30-in. from proposed outer harbor terminal to Los Angeles outer harbor wharf, and 4 miles of 12-in. crude and bunker fuel line from proposed outer harbor terminal to Union's Los Angeles refinery.
Status: Planned.

U.S. Products Pipelines

• **Alaska-Yukon Refiners & Distributors, Ltd.**
Project: Two lines: one 150 miles from Haines to Haines Junction, Alaska, linking with government Canol line; another from Tok Junction, on Canol line, to Anchorage.
Status: Proposed.
Completion: 1959.

• **Buckeye Pipe Line Co.**
Project: 50 miles of 10-in. from Syracuse to Utica, N. Y.
Status: Planned.
Completion: September 1958.

• **Cherokee Pipe Line Co.** (Continental Oil Co., Cities Service Oil Co.)
Project: 78 miles of 12-in. from Ponca City to Tulsa, Okla.
Status: Under way.
Contractor: **Pipeline Service Co.**
Completion: Summer 1958.
Project: Conversion of 400 miles of 10-in. crude line between Glenpool, Okla., and Wood River, Ill.
Status: Under way.
Completion: Summer 1958.

• **Columbia Gas System, Inc.**
Project: 37 miles of 6-in. from Kenova, W. Va., to Siloam, Ky.
Status: Proposed.

• **Emerald Pipe Line Corp., Phillips Petroleum Co., and The Texas Co.**
Project: 300 miles of 6-in. from Amarillo, Tex., to Albuquerque, N. M.
Status: Under way.
Contractor: **Arey Pipe & Construction Co., Inc.,** Pampa, Tex., has 105 miles from Amarillo to Tucumcari, N. M.

• **Everglades Pipe Line Co.**
Project: 35 miles of 10-in. from Port Everglades, Fla., to Miami's International Airport.
Status: Engineering study under way.
Completion: Late 1958.

• **Katy and New York Central Railroads**
Project: 2,000 miles of 10 or 12-in. from Houston through Kansas City, St. Louis, Indianapolis and Cleveland to Syracuse then down to New York City. A branch would go through Chicago to Detroit.
Status: Planned.
Contractor: **Williams Brothers Co.** has feasibility study.
Completion: November 1, 1959.

• **Laurel Pipe Line Co.** (Gulf Refining Co., Sinclair Pipe Line Co., The Texas Co.)
Project: 100 miles of 24-in. and 340 miles of line graduating down to 14-in. at the west terminus, from Philadelphia to Cleveland.
Status: Under way.
Contractor: **Pipe Line Maintenance & Construction Co.,** Camp Hill, Pa., has Susquehanna River crossing. **Missouri Valley Dredging Co.,** Omaha, Neb., has 6 miles of 24-in. from Eagle Point, N. J., to west bank of Delaware River, including Delaware River crossing, and 20 miles of 24-in. from west bank of Delaware River to Laurel's Booth station site in Delaware County, Pennsylvania. **Engineers Limited Pipe Line Co.,** San Francisco, has 106 miles of 24-in. from Booth station to Mechanicsburg station near Harrisburg, Pa. **Panama, Inc.,** Houston, has 78 miles of 20-in. from Mechanicsburg station to Duncansville station, and 113 miles of 18-in. from there to Aliquippa station in Beaver County, Pennsylvania, including Allegheny and Ohio rivers crossing. **Williams Brothers Co.,** Tulsa, has 106 miles of 14-in. from Aliquippa station to Cleveland.
Completion: August 1958.

• **Ohio Oil Co.**
Project: 265 miles of 12-in. from Wood River, Ill., to Chicago.
Status: To start July 1958.
Completion: 1958.

• **Phillips Petroleum Co.**
Project: 44 miles of 8-in. from Rocky Pump Station to Amarillo, Tex.
Status: Planned.

• **Underground Storage & Exploration, Inc.**
Project: 393 miles of 12-in. L.P.G. line from Moundsville, W. Va., to Newark, N. J., plus 95 miles of 6, 8-in. laterals to Mauch Chunk, Pa., and to Philadelphia.
Status: Proposed.

• **Union Oil Co. of California**
Project: 2 miles of 12-in. bunker fuel line from proposed outer harbor terminal to Los Angeles outer harbor wharf, and 4 miles of 12-in. crude and bunker fuel line from proposed outer harbor terminal to

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PIPELINE CONSTRUCTION

Union's Los Angeles refinery.
Status: Planned.

U.S. Natural-Gas Pipelines

- **American Louisiana Pipe Line Co.**
Project: 7 miles of 16-in. and 5 miles of 12-in. from Second Bayou to Cameron, La.
Status: Under way.
Contractor: **Ford, Bacon & Davis Construction Corp.**
Completion: December 1958.
- **Arkansas Louisiana Gas Co.**
Project: A 300-mile line, plus gathering lines, from Tex.-La. coastal area to northern La., to connect with present system.
Status: Proposed.
- **Carnegie Natural Gas Co.**
Project: Two parallel lines to provide coke-oven gas to six Pittsburgh area plants: 9 miles of 55-in. and 4 miles of 43-in. each.
Status: Under way.
Contractor: **Williams Brothers Co.**
Completion: January 1, 1959.
- **Chicago District Pipeline Co.**
Project: 52 miles of 30, 36-in. between Joliet and Chicago, Ill.
Status: Approved by FPC examiners.
Completion: 1958.
- **Coastal States Gas Producing Co. and Southern Coast Corp.**
Project: 45 miles of 2 to 10-in. in Bee County, Tex. to connect presently shutin fields with Texas Eastern Transmission Corp.'s system.
Status: Planned.
- **Coastal Transmission Corp.**
Project: 94 miles of 12-in. between Monte Christo, Tex., and Robstown, Tex.; 175 miles of 20-in. between Robstown and Lochridge, Tex.; 102 miles of 22-in. between Lochridge and Beaumont, Tex.; 193 miles of 24-in. between Beaumont and Baton Rouge, La.
Status: Approved. Survey and right-of-way work under way.
Completion: February 1, 1959.
Project: 365 miles of 3 to 14-in. gathering lines at various locations on Texas and Louisiana Gulf Coast.
Status: Approved.
Completion: February 1, 1959.
- **Colorado Interstate Gas Co.**
Project: 66 miles of 30-in., 40 miles of 34-in., 109 miles of 26-in., and 100 miles of 24-in. from Springfield, Colo., to Pubelo, Colo.; 345 miles of 30-in. from Kit Carson, Colo., to Beatrice, Neb.; 24 miles of 22-in. Tex. Panhandle looping.
Status: Approved by FPC examiners. Delayed until 1959.
- **Commonwealth Natural Gas Corp.**
Project: 16 miles of 12-in. from Waverly to southeast of Wakefield, Va.
Status: Planned.
Completion: July 1, 1958.
Project: 13 miles of 18-in. from Chester to Petersburg compressor station in Va.
Status: Planned.
Completion: September 1, 1958.
- **Consolidated Gas Utilities Corp.**
Project: 21 miles of 12-in. and 10 miles of 8-in. at Altus, Okla.
Status: Approved.
- **Consumers Power Co.**
Project: 45 miles of 24-in. from Overisel field to Lansing Gas system in Mich.
Status: Under way.
Contractor: **Midwestern Constructors, Inc.**
Completion: September 1, 1958.
Project: 45-mile, 24-in. line from Woodbury station to Laingsburg Junction, Mich.
Status: Planned for 1959.
- **Eastern Shore Natural Gas Co.**
Project: 34 miles of 8-in. and 90 miles of 6-in. from connection with Transcontinental Gas Pipe Line Corp., in Maryland, across entire length of Delaware to Salisbury.
Status: Approved.
- **El Paso Natural Gas Co.**
Project: 177 miles of 20-in. from Sonora plant, Sutton County, to Plains plant, Yoakum County, Texas.
Status: Under way.
Completion: August 1, 1958.
Project 203 miles of 30-in. Permian-San Juan crossover loops.
Status: Under way.
Completion: September 1, 1958.
Project: 94 miles of 34-in. San Juan main line loop.
Status: Under way.
Completion: June 1958.
Project: 13 miles of 20-in. and 66 miles of 16-in. Aneth line.
Status: Approved.
Completion: September 1958.
Project: 74 miles of 10-in. Yuma line loop.
Status: Has temporary approval.
Completion: August 1958.
Project: 500 miles of 34-in. from Twin Falls, Idaho to California border near Las Vegas, Nev.
Status: Planned.
Completion: September 1, 1959.
Project: 59 miles of 20-in. in Crane County, Texas, and 9 miles of various size field lines in Pecos County, Texas.
Status: Under way.
Completion: June 1958.
Contractors: **R. H. Fulton & Co.**, Lubbock, has 76 miles of 30-in. on Permian-San Juan crossover and 117 miles of 20-in. in West Texas; **McVean & Barlow, Inc.**, Odessa, has 110 miles of 20-in. in West Texas; **Western Pipelines, Inc.**, Austin, has 20 miles of 34-in. and 22 miles of 26-in. loops in Arizona.

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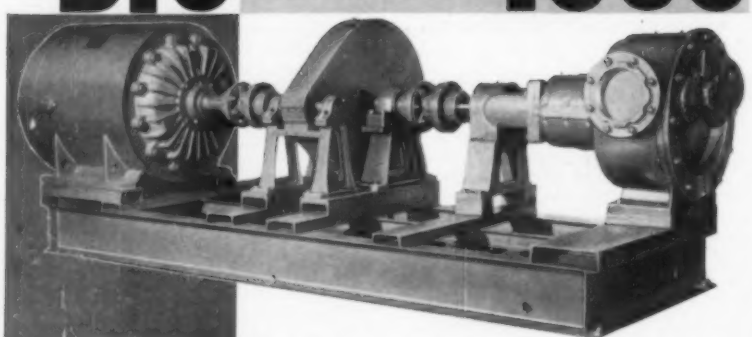

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PIPELINE CONSTRUCTION

Project: 1,000 miles of main line loop from Plains, Tex., to California border.
Status: Planned.
Completion: 1960.

• **Gulf Interstate Gas Co.**
Project: 10 miles of 12-in. supply loop to Erath field, Vermilion Parish, Louisiana and 9 miles of various size field lines in Acadia and Vermilion parishes, Louisiana.
Status: Approved.
Project: 10 miles of 20-in. loop in Jefferson Davis and Vermilion parishes, Louisiana, and 3 miles of 6-in. loop in Cameron Parish, Louisiana.
Status: Has temporary FPC approval.
Project: 352 miles of 30-in. loop between Louisiana and Leach, Ky.; 54 miles of 24-in lateral in Louisiana.
Status: Under way.
Contractor: **Houston Contracting Co.** has 216 miles of the 30-in. with two spreads working: 110 miles beginning near Inverness, Miss., A. J. Slovack, supt., office at Greenwood, Miss.; 106 miles beginning near Jena, La., L. A. Young, supt., office at Jena. **H. C. Price Co.** has 132 miles in Kentucky and Tennessee, R. L. Ezell, supt., office at Stanford, Ky.; C. R. Ice, supt., office at Tompkinsville, Ky.
Completion: November 1, 1958.

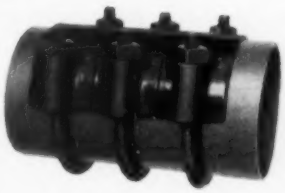
• **Houston Texas Gas & Oil Corp.**
Project: 702 miles of 24-in. from Baton Rouge, La., to Kissimmee, Fla.; 139 miles of 18-in. and 101 miles of 20-in. from Kissimmee to Cutler, Fla.; 642 miles of 3 to 18-in. sales laterals in Florida. Main line to join Coastal Transmission's line from McAllen, Tex., to Baton Rouge.
Status: Right-of-way procurement under way.
Contractor: **Midwestern Constructors** has the 702 miles of 24-in.; **Harbert Construction Corp.** has remainder.
Completion: 1959.

• **Humble Oil & Refining Co.**
Project: 250 miles of 26 or 30-in. from Southwest Texas area to Houston, plus 200 miles of various size gathering lines.
Status: Planned.
Completion: 1960.
Project: 67 miles of 30-in. between Clear Lake and Lovell Lake junction, Tex., and 24-in. from there on to Port Arthur.
Status: Under way.
Contractor: **Sharman, Allen, Gay & Taylor** have 39 miles from Hankamer to Port Arthur, to complete July 1, 1958. **Panama-Williams Corp.** has 39 miles from Clear Lake to Hankamer. **Gulf Welding & Machine Works,** Conroe, Tex., has the Houston Ship Channel crossing.

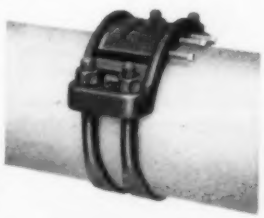
• **Iron Ranges Natural Gas Co.**
Project: 70 miles of 6 to 16-in. in Mesabi Iron Range area.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 63 miles of 12-in. between Duluth and Silver Bay, Minn.
Status: Pending FPC approval.
Completion: November 1, 1958.

• **Lone Star Gas Co.**
Project: 18 miles of 6-in. loop in Hamilton County, Texas.
Status: Planned.
Contractor: Company forces.
Completion: July 1, 1958.
Project: 11 miles of 16-in. relocation of line around Abilene, Tex.
Status: Planned.
Contractor: Company forces.
Completion: August 1, 1958.
Project: 22 miles of 20-in. loop in Henderson and Navarro counties, Texas.
Status: Planned.
Contractor: Company forces.
Completion: October 1, 1958.

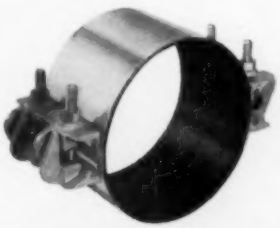
No shut-downs to repair leaking pipe the DRESSER way!



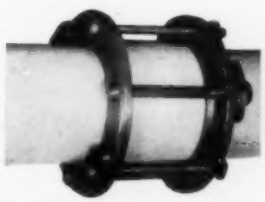
For repairing pitholes and longitudinal splits in steel pipe. **Split Repair Clamp** Style 79-B.



For repairing leaks in high pressure steel lines. **Permaclamp** Style 75 (type 1).



For repairing full breaks or holes in Asbestos-Cement pipe. **All-Around Repair Clamp** Style 360.



For leaks through threads of screw collars. **Collar Clamps** Styles 4 & 41.

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PIPELINE CONSTRUCTION

• **Manufacturers Light and Heat Co.**
Project: 6 miles of 26-in. from Hickory to Primrose, Pa.
Status: Pending FPC approval.
Completion: July 1958.
Project: 5 miles of 12-in. from Empire to Toronto, Ohio.
Status: Plan to file for FPC approval.
Completion: September 1958.
Project: 9 miles of 8-in. from Stuebenville to Wintersville, Ohio.
Status: Planned.
Completion: December 1958.
Project: 9 miles of 8-in. from Berlin to Somerset, Pa.
Status: Planned.
Completion: January 1959.

• **Michigan Consolidated Gas Co.**
Project: 67 miles of 10 and 12-in. between Sears and Travers City, Mich.
Status: Under way.
Contractor: **Somerville Construction Co.**; Floyd Huduall, supt., office at Cadillac.
Project: 60 miles of 10 and 12-in. between Muskegon and Ludington, Mich.
Status: Under way.
Contractor: **Somerville Construction Co.**, jointly with **H. L. Gentry Construction**, Frank Morris, superintendent, office at Hart, Mich.

• **Michigan Gas Storage Co.**
Project: 40 miles of 26-in. from storage fields in Michigan, to Consumers Power Co. distribution system.
Status: Under way.
Contractor: **Midwestern Constructers, Inc.**

• **Michigan Wisconsin Pipe Line Co.**
Project: 33 miles of 4, 6-in., 2 miles of 12-in., 4 miles of 10-in., and 7 miles of 8-in. gathering lines in LaVerne Field, Harper County, Okla.
Status: Planned. Pending FPC approval
Completion: October 1, 1958.
Project: 56 miles of 20-in. extension of LaVerne line, Harper County, Okla.
Status: Planned. Pending FPC approval
Completion: October 1, 1958.
Project: 25 miles of 12-in. and 21 miles of 24-in. loops in Wis. and Mich.
Status: Planned. Pending FPC approval
Completion: October 1, 1958.

• **Montana-Dakota Utilities Co.**
Project: 12-mile, 12-in. line parelling main line between Billings and Laurel, Mont.
Status: Planned.
Completion: Fall 1958.

• **Natural Gas Pipeline Co. of America**
Project: 389 miles of 36-in. loops along its line from Beatrice, Neb., to Chicago, to take gas from proposed line of Colorado Interstate Gas Co., and 91 miles of 30-in. loops along parts of its main line.
Status: Approved by FPC Examiner. Delayed until 1959.
Project: 337 miles of 30-in. between Fritch, Tex., and Beatrice, Neb., and 59 miles of 36-in. between Beatrice and Joilet, Ill., along existing system.
Status: Pending FPC approval.
Completion: 1959.
Project: 232 miles of 36-in. between Beatrice, Neb., and Joliet, Ill., and 258 miles of 36-in. and 21 miles of 26-in. between the Texas Panhandle and Beatrice.
Status: Pending FPC approval.

• **New York State Natural Gas Corp.**
Project: Replacing 12 miles of 20-in. with 30-in. from Newfield to Dryden, N. Y.
Status: Under way.
Contractor: **Pipeline Maintenance & Construction, Inc.**, Camp Hill, Pa.
Completion: July 15, 1958.
Project: Replacing 13 miles of 12-in. with 20-in. from Harrison to Genesee, Pa.
Status: Pending FPC approval, plans are to start in June.
Contractor: **Harford Brothers,** Emporium, Pa.
Completion: August 1, 1958.
Project: 30 miles of 20-in. from Castile to Elma, N. Y.
Status: Pending FPC approval, plans are to start July 7, 1958.
Contractor: **Joyce Pipe Line Co.**, Andover, N. Y.
Completion: October 10, 1958.
Project: 12, 6, 8-in. lines for storage project at Woodhull, N. Y.
Status: Under way.
Contractor: **Felmont Oil Corp.**, Bradford, Pa.
Completion: August 29, 1958.
Project: 12, 10, 8, 6-in. storage lines in Leidy and Stewardson Townships, Pa.
Status: Pending FPC approval, plans are to start July 7, 1958.
Contract: **Harford Brothers,** Emporium, Pa.
Completion: November 1, 1958.

• **North Carolina Natural Gas Corp.**
Project: 630 miles of 2 to 16-in. from near Mooresville, eastwardly across N. C.
Status: To start in July or August.
Completion: 1958.

• **Northern Illinois Gas Co.**
Project 140 miles of 24-in. from East Dubuque, Ill., to Des Plaines, Ill.
Status: Pending FPC approval.
Contractor: **Williams Brothers Co.** has preliminary engineering and right-of-way studies under way.
Completion: November 1, 1958.

• **Northern Natural Gas Co.**
Project: 18 miles of 20-in. from Dubuque, Iowa, to Menominee, Ill.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 19 miles of 30-in. from South

20-foot power-augering equipment operated by CSI.

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PIPELINE CONSTRUCTION

Sioux City to Oakland, Neb.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 9 miles of 30-in. from Palmyra to Beatrice, Neb.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 11 miles of 30-in. from Clifton to Tescott, Kan.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 8 miles of 30-in. from Tescott to Bushton, Kan.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 11 miles of 30-in. from Sunray, Tex., to Beaver, Okla.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 8 miles of 30-in. and 44 miles of 16-in. from Beaver, Okla., to Mullinville, Kan.
Status: Pending FPC approval.
Completion: November 1, 1958.
Project: 169 miles of 20-in. from Farmington, Minn., to Superior, Wis.
Status: Pending FPC approval.
Project: 23 miles of 24-in. main line loops in Nebraska.
Status: Pending FPC approval.
Project: 43 miles of 20-in. main line loops in Kansas, Nebraska, and Iowa.
Status: Pending FPC approval.
Project: 44 miles of 16-in. in Duluth-Superior area.
Status: Pending FPC approval.
Project: 1,100 miles of 26-in. from Montana border to Minneapolis, Minn. (See Northern Natural Gas Co. in Canadian Natural Gas Pipeline section).
Status: Planned.
Project: 1,090 miles of 2 to 16-in. branch lines in Minnesota, Iowa, South Dakota, Nebraska, and Wisconsin.
Status: Pending FPC approval.
Project: 57 miles of 30-in. main line loops in Nebraska and Kansas.
Status: Pending FPC approval.

• **Northern Utilities Co.**
Project: 35 miles of 16-in. in Fremont-Natrona County, Wyoming, area; 8 miles of 12-in. around Casper; 6 miles of 8-in. from Sand Draw gas field to Beaver Creek field; 12 miles of 6-in. from Beaver Creek field to the system servicing the Riverton-Lander area.
Status: Planned.

• **Offshore Gathering Corp.**
Project: 364 miles in Gulf of Mexico off Louisiana: 60 miles of 24-in., 70 miles of 26-in., 234 miles of 30-in. (Dual line.)
Status: Application pending with FPC.

• **Ohio Fuel Gas Co.**
Project: 15 miles of 12-in. from Line H, Crawford Station to Zanesville, Ohio.
Status: Planned.
Completion: September 1, 1958.
Project: 3 miles of 20-in. from Line D-357 to near Marion, Ohio.
Status: Planned.
Completion: August 30, 1958.
Project: 2 miles of 12-in. from Line Z to near Troy, Ohio.
Status: Planned.
Completion: September 15, 1958.
Project: 10 miles of 8-in. from Line O-1463 to near St. Clarisville, Ohio.
Status: Planned.
Completion: October 5, 1958.
Project: 4 miles of 20-in. from Line A-97 to near Dayton, Ohio.
Status: Planned.
Completiton: October 2, 1958.
Project: 7 miles of 18-in. from line Z-50 to near Dayton, Ohio.
Status: Planned.
Completion: July 1, 1958.
Project: 13 miles of 4 to 20-in. from Medina storage to near Medina, Ohio.
Status: Planned. Filed application January 16, 1958.
Completion: July 25, 1958.
Project: 15 miles of 12-in. from Line L-400 at Shreve, Ohio, to Minerva, Ohio.
Status: Planned.
Completion: August 5, 1958.
Project: 4 miles of 8-in. from Line Z-207 to near Bellefontaine, Ohio.
Status: Planned.
Completion: July 20, 1958.
Project: 4 miles of 20-in. from Line L-2542 to near Oberlin, Ohio.
Status: Planned.
Completion: August 12, 1958.

• **Oklahoma Missouri Gas Transmission Co.,** Liberty Bank Building, Oklahoma City.
Project: 500 miles of 24-in. from Central Oklahoma to St. Louis.
Status: Proposed.

• **Pacific Gas & Electric Co.**
Project: 160 miles of 12-in. from Corning to Eureka, Calif.
Status: Under way.
Contractor: **Engineers Limited Pipeline Co. and Alex Robertson Co.**
Completion: July 1958.
Project: 7 miles of 8-in. from Eureka to Arcata, Calif.
Status: Planned.
Contractor: Company personnel.
Completion: December 1958.

• **Pacific Lighting Gas Supply Co.**
Project: 83 miles of 34-in. from North Coles Levee to Newhall, Calif.
Status: Under way.
Contractor: **Engineers Limited Pipeline Co.**

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PIPELINE CONSTRUCTION

Completion: July 1, 1958.

Project: 128 miles of 34-in. from Topock to Newberry, Calif.

Status: Filed April 1958, for California Public Utilities Commission approval.

Completion: November 1, 1959.

• **Pacific Northwest Pipeline Corp.**

Project: 40-mile line from Ute Trail gas fields in northeastern Utah to its main line in western Colorado.

Status: Planned to start spring 1958.

Project: 51 miles of 30-in. from main line to Big Piney field, Wyoming, looping present 16-in. lateral.

Status: Pending FPC approval.

• **Panhandle Eastern Pipe Line Co.**

Project: 95 miles of 4-in., 45 miles of 6-in., 38 miles of 8-in., 3 miles of 10-in., and 12 miles of 12-in. gathering lines in Kansas, Oklahoma, and Texas.

Status: Under way.

Contractor: **Hall Construction Co.**

Completion: December 31, 1958.

Project: 33 miles of 16-in. from Muncie, Ind., to Hollansburg, Ohio.

Status: Under way.

Contractor: **O. R. Burden Construction Corp.**

Completion: September 1, 1958.

• **Pennsylvania Gas Co.**

Project: 23 miles of 10-in. in Erie County, Pa., 15 miles of 8-in. in Warren and Chautauqua counties, Pa., 30 miles of branch lines, several small distribution lines.

Status: Has FPC permit.

• **Peoples Natural Gas Co.**

Project: 20 miles of 20-in. from Derry to Morrellville, Pa.

Status: Planned.

Completion: August 1958.

Project: 8 miles of 10-in. from Altoona to Tyrone, Pa.

Status: Under way.

Contractor: **Reese Construction Co.**

Completion: August 1958.

Project: 4 miles of 12-in. from Elders Ridge to Clarksburg, Pa.

Status: Planned.

Completion: July 1958.

Project: 6 miles of 12-in. from Leechburg to New Kinsington, Pa.

Status: Planned.

Completion: July 1958.

Project: 7 miles of 12-in. from Gibsonia to Mars, Pa.

Status: Under way.

Contractor: **Reason Construction Co.**

Completion: July 1958.

Project: 3 miles of 12-in. from Elizabeth to Webster Pool, Pa.

Status: Planned.

Completion: August 1958.

Project: 17 miles of 10-in. from Laurel Ridge, Pa., south.

Status: Planned.

Completion: August 1958.

Project: 17 miles of 24-in. from McKeesport, Pa., south.

Status: Planned.

Completion: September 1958.

• **Phillips Petroleum Co.**

Project: 25 miles of 6 through 20-in. in South Eunice, N. M., area.

Status: Planned.

Project: 52 miles of 4 through 20-in. in Gaines County, Texas.

Status: Under way.

Contractor: **Vaughn & Taylor Construction Co., Inc.**

Completion: August 1.

Project: 10 miles of 3 through 20-in. in Hutchinson County, Texas.

Status: Under way.

Contractor: **H. A. McGinnis.**

Completion: December 31, 1958.

• **Piedmont Gas Co.**

Project: 78 miles of 2 to 8-in. extension off Trancontinental in North Carolina to serve Gaston, Lincoln, Catawba, Caldwell, and Burke counties.

Status: Has FPC approval.

• **Pioneer Gathering System, Inc.**

Project: Gathering lines at Texas fields: 7 miles of 4-in. in Buckhorn field; 2 miles of 6-in., 1 mile of 4-in., and 2 miles of 8-in. in Vinegarone field; 2 miles of 3-in. in Mt. Ketchum field; 4 miles of 3-in., 1 mile of 2-in., and 16 miles of 4-in. in Tilleny field; 7 miles of 2-in. in Mertyon field.

Status: Plans to file for FPC permit.

Completion: November 1, 1958.

• **Signal Oil & Gas Co.**

Project: Considering expansion of gathering system for its sulfur-extraction plant at Tioga, N. D., into the developing oil area near the Canadian border in Burke County.

Status: Decision expected spring 1958.

• **Southern California Gas Co.** and **Southern Counties Gas Co.**

Project: 18 miles of 30-in. from near Newhall, Calif. to Burbank Boulevard and Yarmouth Avenue in Los Angeles.

Status: Planned.

Completion: December 1958.

• **Southern Natural Gas Co.**

Project: Supply lines in South Louisiana: 4 miles of 16-in. Bayou Long field lateral; 7 miles of 16-in. Little Bayou Pigeon lateral; 4 miles of 6-in. Mystic Bayou field lateral; 2 miles of 6-in. East Bayou Pigeon lateral.

Status: Approved.

Project: 7 miles of 24-in. from Gwinville to Pickens, Miss.

Status: Approved.

Project: 13 miles of 10-in. Tanting field lateral in South Louisiana.

Status: Planned. Pending FPC approval.

Project: 3 miles of 8-in. Dexter field lateral in Mississippi.

Status: Planned. Pending FPC approval.

Project: Supply lines in South Louisiana: 46 miles of 20-in. from White Castle to South Section 28 field; 7 miles of 10-in. Bayou Boullion field lateral; 11 miles of 8-in. East Happytown field lateral; 8 miles of 10-in. and 11 miles of 8-in. Loisel field lateral; 17 miles of 20-in. Lake Washington field lateral; 22 miles of 12-in. West Delta Block 30 lateral; 4 miles of 8-in. Bayou Long field lateral; 6 miles of 4-in. Bayou Villars field lateral; 12 miles of 6-in. Marrero field lateral; 6 miles of 6-in. South Lake Long field lateral; 1 mile of 4-in. Tigers Ridge field lateral; 35 miles of 16-in. Montegut field lateral; 13 miles of 16-in. Barataria Line loop; 69 miles of 24-in. from Toca to Franklinton.

Status: Approved.

Project: 67 miles of 24-in. from Gwinville to Enterprise, Miss.; 71 miles of 24-in. from Enterprise to Gallion, Ala.; 83 miles of 24-in. from Gallion to Elmore, Ala.; 43 miles of 20-in. and 46 miles of 24-in. from Elmore to Ellerslie, Ga.; 69 miles of 20-in. from Ellerslie to Ocmulgee, Ga.; 79 miles of 16-in. from Ocmulgee to Wrans, Ga.; 8 miles of 6-in. Vicksburg, Miss., loop line; 5 miles of 12-in. Amory, Miss., loop line; 9 miles of 8-in. Calera, Ark., loop line; 23 miles of 14-in. Rome, Ga., loop line; 9 miles of 8-in. at LaGrange, Ga.; 62 miles of 14-in. from Ocmulgee, Ga. to Atlanta, Ga.

Status: Planned. Pending FPC approval.

Project: Facilities to attach additional gas supplies in South Louisiana: 6 miles of 8-in. from Ship Shoals Block 28 to Block 32; 29 miles of 16-in. from Ship Shoals Block 28 to Atchafalaya Bay; 15 miles of 16-in. from north shore Atchafalaya Bay to Patterson; 6 miles of 16-in. from Patterson to Duck Lake; 8 miles of 6-in. Bayou Felice lateral; 1 mile of 4-in. Triumph field lateral; 2 miles of 8-in. Coffee Bay field lateral.

Status: Planned for 1958-1959.

Project: Facilities to attach additional gas supplies in Mississippi: 8 miles of 8-in. Hub field lateral; 40 miles of 14-in. and 40 miles of 16-in. from Cranfield to Gwinville.

Status: Planned for 1958-1959.

Project: Gathering system loops in Louisiana: 42 miles of 20-in. from White Castle to Franklinton; 17 miles of 20-in. from Olga to Toca.

Status: Planned for 1958-1959.

• **Tennessee Gas Transmission Co.**

Project: 556 miles of 30-in. from Mississippi Delta area south of New Orleans to Portland, Tenn.

Status: Has temporary FPC approval.

Project: 76 miles of 24-in. from Coudersport, Pa., to Hamburg, N. Y.

Status: Has temporary FPC approval.

Project: 163 miles of 30-in. and 101 miles of 26-in. from Portland, Tenn., to near Lancaster, Ky.; from Winchester, Ky., to Morehead, Ky.; from Catlettsburg, Ky., toward Broad Run, W. Va.; from New Wilmington, Pa., to Mercer, Pa.; and from Morehead, Ky., to Catlettsburg, Ky.

Status: Has Temporary FPC approval.

• **Tensas Gas Gathering Corp.**

Project: 37 miles of 2 to 8-in. from Rodney Field, Miss., westerly to connect with Olin Gas Transmission Co.'s line in Tensas Parish, Louisiana.

Status: Approval April 1958.

• **Texas Eastern Penn-Jersey Transmission Corp.**

Project: 12 miles of 30-in. looping in Pa.

Status: Approved.

Contractor: **H. C. Price Co.**

• **Texas Eastern Transmission Corp.**

Project: 17 miles of 8-in. and 3 miles of 6-in. from its 20-in. Baytown-Hankamer line to Alco-Mag field in Harris County, Texas.

Status: Has FPC approval.

Project: 22 miles of 14-in. from Rayne field to near Opelousas, La.

Status: Has FPC Examiner's approval.

Completion: November 1958.

Project: 47 miles of 30-in. looping in Kentucky and Ohio.

Status: Under way.

Contractor: **H. C. Price Co.**, G. A. Reutzel, supt., office at Caldwell, Ohio; W. H. Olrich, supt., office at Danville, Ky., to later move to Portsmouth, Ohio.

• **Texas Illinois Natural Gas Pipeline Co.**

Project: 860 miles of 30-in. looping of present system.

Status: Planned.

Completion: 1960-1961.

• **Transcontinental Gas Pipe Line Corp.**

Project: 202 miles of 36-in. and 132 miles of 30-in. main line loop; 150 miles of 23-in. and 24 miles of 24-in. from Leidy storage field in Pa., to its trunk line to N.Y., 202 miles of 10 to 20-in. gathering lines in southeast La.; 48 miles of 10 to 20-in. to tap gas off Tex.

Status: Pending FPC approval.

Contractor: **Bechtel Corp.** has the 150 miles of 23-in. to connect storage in Pa.

Project: 57 miles of 36-in. main line loop.

Status: Pending FPC approval. Planned for 1959.

Project: 87 miles of 24-in. laterals, plus small gathering lines connecting seven Louisiana fields with the New Orleans area.

Status: Pending FPC approval.

• **Transwestern Pipe Line Co.** (Warren Petroleum, Monterey Oil Co.; J. R. Butler).

Project: 635 miles of 24-in. from Perryton and Fort Stockton, Tex., to Roswell, N. M., and 670 miles of 30-in. from Roswell to Topock, Ariz.

Status: Pending FPC approval.

Completion: Mid-1959.

PIPELINE CONSTRUCTION

• **Trunkline Gas Co.**
Project: 24, 26-in. Red River crossing in Rapides Parish, Louisiana.
Status: Filed for FPC approval April 1958.
Contractor: **Missouri Valley Dredging Co.**
Completion: January 1959.

• **United Gas Corp.**
Project: 17 miles of 12-in. and 1 mile of 6, 8-in. from Lirette-Mobile line in Jackson County, south to Bayou Casottee industrial area east of Pascagoula, Miss.
Status: Under way.
Contractor: **Houston Contracting Co.**, L. A. Young, supt., office at Moss Point, Miss.
Project: 117 miles of 30-in. loop from southeast Louisiana, to Mobile, Ala.
Status: Approved.
Project: 12 miles of 16-in. and 16 miles of 8-in. on Gulf Coast of Louisiana, in Terrebone Parish.
Status: Under way.
Contractor: **Brown & Root, Inc.**
Project: 3 miles of 8-in. from Lake Hatch field to Lirette-Napoleonville line in Terrebonne Parish, Louisiana.
Status: Planned. Approved.
Project: 4 miles of 6-in. from Southeast Houma field to North Houma field line in Terrebonne Parish, Louisiana.
Status: Planned. Approved.
Project: 3 miles of 6-in. from Lake Fields field to Lake Long-St. Rose line in Terrebonne Parish, Louisiana.
Status: Under way.
Contractor: **J. Ray McDermott & Co., Inc.**, of New Orleans.
Project: 4 miles of 12-in. from Fairbanks-Rosslyn-North Houston field facilities to near Houston.
Status: Planned.
Project: 5 miles of 20-in. from Refugio-Houston line to Smither Lake.
Status: Under way.
Contractor: **Fowler-Tatom** of Cotton Valley, La.

• **Western Slope Gas Co.**
Project: 7 miles of 4-in. gathering lateral in northwestern Colorado.
Status: Planned.
Completion: July 1, 1958.

Canadian Crude-Oil Pipelines

• **Act Oils, Ltd.**
Project: A 450-mile line from the Peace River region of northern B. C. to tidewater at Kitimat, B. C.
Status: Request has been made for permit from the B. C. government.

• **B-A Alberta Pipe Line, Ltd.**
Project: 35 miles of 8-in. to connect Drumheller field, Alberta, with existing lines running to Edmonton.
Status: Pending approval.

• **Bituminous Oil Pipeline Co.** (Royalite Oil Co. and Can-Amera Oilsands Development, Ltd.)
Project: 250-mile line from Athabasca oil sands in northeastern Alta., to Edmonton.
Status: Long-range plans.
Completion: 1960.

• **East Coast Transmission Co.** (Pacific Petroleums, Ltd., Home Oil, Ltd., Canadian Homestead Oil, Ltd., Merrill Petroleums, Ltd.)
Project: Line from Alberta to Montreal.
Status: Proposed.

• **Federated Pipe Lines, Ltd.**, Calgary (subsidiary of Home Oil Co., Ltd.).
Project: 130 miles of 10-in. from Swan Hills area to Edmonton, Alta.
Status: To start May or June 1958.

• **Interprovincial Pipe Line Co.**
Project: 82 miles of 24-in. loops in Alta. and Sask.
Status: Under way.
Contractor: **Piggott Construction, Ltd.**, Edmonton, Alta.
Completion: September 1958.

• **Mid-Continent Pipe Lines, Ltd.**
Project: 1,500-mile, 30-in. line from Edmonton to Chicago via Alberta, Saskatchewan, North Dakota, Minnesota, Wisconsin, and Illinois; U.S. section to be owned by International Oil Pipeline Corp.
Status: Permit sought from Canadian Board of Transport Commissioners; W. C. Gilman & Co., New York, has made preliminary study.

• **Peace River Oil Pipe Line Co., Ltd.**
Project: 70-mile line including 8 miles of 6-in., 45 miles of 8-in., and 17 miles of 12-in. from its Fox Creek pump station to Windfall, Virginia Hills, and Swan Hills fields, Alberta.
Status: Pending approval of Alberta Government.

• **Producers Pipelines, Ltd.**
Project: 50 miles of 4, 6-in. gathering line extensions in fields in southeast Sask.
Status: Under way.
Contractor: **Majestic Contractors, Ltd.**, Jeff Minter, supt., office at Estevan.
Completion: October 30, 1956.

• **Westcoast Transmission Co., Ltd.**
Project: Line to parallel its 650-mile, 30-in. gas line from Peace River to Vancouver, B. C.
Status: Under study.

Canadian Products Pipelines

• **Hydrocarbons Pipeline Co.**
Project: 800 miles of 6 and 8-in. L.P.G. line from near Edmonton, Alta., to Fort William, Ont.
Status: Has permit from Parliament of Canada. Seeking approval by Federal Board of Transport Commissioners and the Alberta Petroleum and Natural Gas Conservation Board.
Construction consultants: **Dutton-Williams Brothers, Ltd.**, and **A. D. Little Co.**

Canadian Natural-Gas Pipelines

• **Alberta Gas Trunk Line Co., Ltd.**
Project: 145 miles of 24-in. from Pincher Creek to Princess, Alta., including 11 major canal crossings.
Status: Under way.
Contractor: **Piggott Construction, Ltd.**, Calgary.
Completion: September 1, 1958.
Project: 24 miles of 26-in. from Steveville to Princess, Alta.
Status: Under way.
Contractor: **Fulton Banister, Ltd.**
Completion: June 30.
Project: 50 miles of 34-in. from Princess to Cavendish, Alta.
Status: Under way.
Contractor: **Fulton Banister, Ltd.**
Completion: June 30.
Project: 11 miles of 6-in. at Sibbald field and 5 miles of 6-in. at Atlee Buffalo, Alta.
Status: Planned.
Completion: September 1, 1958.

• **Alberta & Southern Transmission Co., Ltd.**
Project: 1,300 miles of 36-in. from Alberta to San Francisco area plus 47 miles of gathering lines.
Status: Planned.
Completion: 1960.

• **British American Oil Co., Ltd.**
Project: 20 miles of 2 to 14-in. wet gas condensate gathering system in Pincher Creek, Alta., area.
Contractor: **Mannix Co., Ltd.**, R. L. Tulford, supt.

• **Canadian Western Natural Gas Co., Ltd.**
Project: 58 miles of 16-in. from Carbon field to Calgary, Alta.
Status: Proposed. Pending approval of Alberta Oil and Gas Conservation Board.

• **Northern Natural Gas Co.**
Project: 73 miles of 20-in. from Savanna Creek to Pincher Creek, Alta.
Status: Planned.
Project: 32 miles of 24-in. from Pincher Creek, Alta., to Montana border to tie in with planned U. S. line on to Minneapolis, Minn.
Status: Planned.

• **Northern Ontario Natural Gas Co., Ltd.**
Project: 90 miles of 10-in. from North Bay to Sudbury, Ont.
Status: Under way.
Contractor. **Mannix, Ltd.**, V. D. Worcester, supt., office at Verner.
Completion: Late fall 1958.

• **Northern Ontario Pipe Line Crown Corp.**
Project: 675 miles of 30-in. from the Ontario-Manitoba border to near Kapuskasing, Ont. (part of the 2,250-mile Trans-Canada line; will be leased to Trans-Canada Pipe Line Co. with option to buy). 360 miles from Port Arthur to Kapuskasing remains to be laid in 1958.
Status: Under way.
Contractor: **Nelen, Ltd.; Majestic Contractors, Ltd.; B. C. River Construction, Ltd.**, has 91 miles from Longlac to Hurst, E. L. Maggard, supt., office at Longlac, to complete October 1; **Mannix, Ltd.**, has 92 miles from 35 miles west of Hearst, Ont., to Kapuskasing, Odis Hare, supt., office at Hearst; **Morrison Shivers, Ltd.**
Completion: November 1958.

• **Northwestern Utilities, Ltd.**
Project: 4 miles of 16-in., 4 miles of 12-in., 4 miles of 10-in., 5 miles of 8-in., 29 miles of 6-in., and 3 miles of 4-in. Pembina field gathering system, including an 8-in. crossing of Pembina River, and a 16-in. crossing of North Saskatchewan River.
Status: Under way.
Contractor: **Mannix Co., Ltd.**, S. Steffen, supt., office at Drayton Valley.
Completion: September 30, 1958.
Project: 45 miles of 16-in. from Pembina field to tie in with existing 26-mile, 16-in. oil line terminating at Edmonton, Alta., which Northwestern is buying from Pembina Pipeline, Ltd., and which will be converted to gas.
Status: Under way.
Contractor: **Mannix Co., Ltd.**
Completion: September 30, 1958.

• **Saskatchewan Power Corp.**
Project: 5 miles of 16-in., 18 miles of 10-in., 4 miles of 8-in., 13 miles of 4-in., and 13 miles of 3-in. Many Islands gathering system in Alta.; 6 miles of 8-in., 4 miles of 6-in., 3 miles of 4-in., and 13 miles of 3-in. Hatton gathering system in Sask.; 38 miles of 12-in. extension of Steelman-Regina line; 124 miles of 10-in. extension of Regina-Moose Jaw line; 90 miles of 14-in. from Hatton to the Success-Moose Jaw line.
Status: Planned.
Contractor: **Fulton Banister, Ltd.**, has the Steelman-Regina-Moose Jaw lines. **Swift Current Construction Co.** and **Engelking & James, Ltd.**, have the Many Islands gathering lines. **Robb Construction, Ltd.**, has the Hatton gathering lines. **Engelking & James, Ltd.**, has the Hatton to Success-Moose Jaw line.
Completion: September 30, 1958.

• **Trans-Canada Pipe Lines, Ltd.**
Project: 491 miles of 30-in. from Kapuskasing to Toronto.
Contractors: Starting at Kapuskasing and going toward Toronto, **Grayco Contractors, Inc.**, has 82 miles; **Majestic Contractors, Ltd.**, has 83 miles; **Dutton-Williams Brothers, Ltd.**, has 57 miles; **Canadian Bechtel, Ltd.**,

PIPELINE CONSTRUCTION

has 47 miles from Rib Lake to Tilden Lake, H. F. (Hank) Mogg, general supt., office at Timagami; **Morrison-Shivers, Ltd.,** has 62 miles; **H. C. Price Co.** and **Poole Construction Co.** has 63 miles; **Oklahoma Pipe Line Constructors** has 92 miles.

Completion: October 1, 1958.

- **Van Tor Oils & Exploration Co.,** Vancouver.

Project: Line from B. C. mainland to Vancouver Island.

Status: Proposed.

Completion: 1960.

- **Westcoast Transmission Co., Ltd.**

Project: 110 miles of 30-in. and 176 miles of 20-in. from East Calgary and Savanna Creek fields to Kingsgate on B.C.-Idaho border.

Status: Planned.

Completion: November 1, 1958.

Project: Looping of present system to double capacity.

Status: Planned.

Project: 80 miles of 8, 10, 12, 18, 20-in. extension of gathering system along Alaska Highway in Northeastern B. C.

Status: Under way.

Contractor: **Dutton-Williams Brothers, Ltd.,** Doyle Cook, asst. supt., office at Dawson Creek.

Completion: August 1958.

Foreign Crude-Oil Pipelines

- **Bolivia-Paraguay.**

Project: 500 miles of 6-in. from Southeast Bolivia to a proposed refinery on Paraguay River, and later to Asuncion.

Status: Planned .

Contractor: **Five Lilles,** a French Combine.

- **Burmah Oil Co., Ltd.**

Project: 250 miles of 20-in. from Barauni to Calcutta, India, extending Assam Oil Co.'s proposed line.

Status: Survey under way.

Contractor: **Collins Construction Co.** is surveying locations for some 40 river crossings.

- **Caltex**

Project: 30 miles of 30-in. from Duri field in Sumatra to Dumai where a deepwater terminal will be built. Line will be extended 35 miles to Minas field later.

Status: Under way.

Contractor: **Bechtel Corp.**

Completion: 1958.

- **Cia. Shell de Venezuela**

Project: 70 miles of 30 and 34-in. heated line from Bachaquero to Puerto Miranda, and an unheated 31-in. parallel to the section from Cabimas to Puerto Miranda.

Status: Under way.

Contractor: **Williams Brothers Sudamericana, Ltd.**

- **Colombian Petroleum Co.**

Project: 42 miles of 6-in. from Tibu field to Rio de Oro in Colombia.

Status: Under way.

Status: Pipe has been ordered.

- **Creole Petroleum Corp.**

Project: 90 miles of 30-in. and 4 miles of 24-in. from Temblador field to Caripito in Venezuela.

Status:Under way.

Contractor: **Pipe Line Engineering Co.** and **Oklahoma Pipe Line Constructors,** R. J. O'Connell, supt., office at Maturin.

Completion: June 1958.

- **Elbarz Oil Corp.**

Project: 1,000 miles of 38-in. to move Qum crude to the Mediterranean.

Status: Planned.

- **Iranian Oil Participants, Ltd.**

Project: 30 miles of 20-in. and 22 miles of 16-in. looping of Agha Jari to Bandar Mashur line.

Status: Planned.

Project: 50 miles of 26, 28-in. from Gach Saran field to new terminal at Kharg Island in the Persian Gulf.

Status: Planned.

Contractor: A joint venture of **Raymond Concrete Pile Co.** and **Williams Brothers Co.** of Tulsa; **Richard Costain, Ltd.,** and **John Brown, Ltd.,** of Britain; **Werkspoor & Bredoro** of The Netherlands.

- **Iraq Petroleum Co.**

Project: About 600 miles of up to 40-in. from Kirkuk field through Iraq to Turkish port of Iskenderun on the Mediterranean.

Status: Proposed. Survey completed.

- **Israel Government**

Project: 90 miles of 16-in. running northward along the Mediterranean Coast from Asdod Yam.

Status: Planned.

Completion: Mid-1958.

- **Kuwait Oil Co., Ltd.**

Project: 61 miles of 30-in. from Raudhatain area to Ahmadi.

Status: Under way.

Completion: June 1959.

Project: 14 miles of 34, 36-in. No. 5 Transit Line, including loop line.

Status: Under way.

Completiton: August 1958.

Project: 7 miles of 38, 40-in. No. 11 Gravity Line from North Ahmadi Tank Farm to North Pier.

Status: Planned.

Completion: December 1958.

Project: 7 miles of 38, 40-in. No. 12 Gravity Line.

Status: Planned.

Completion: April 1959.

Status: Proposed.

- **Middle East Pipeline**

Project: 1,500 miles of 38 and 40-in. line from Persian Gulf to Mediterranean at Iskenderun, Turkey.

- **North-West Oil Pipeline Co.** (newly formed by six West German refiners, headed by affiliates of Standard Oil Co. (N.J.), and British Petroleum Co., Ltd.)

Project: 230 miles of 28-in. from refining centers in the industrial Ruhr area of West Germany to Wilhelmshaven.

Status: Under way.

Contractor: **W. M. Lyles** in joint venture with two German steel firms.

Completion: November 1958.

- **Petroleo Brasileiro S.A. (Brazil)**

Project: 40 miles of 12-in. from Catu to Madre de Deus in Bahia.

Status: Under way.

Contractor: **Techint, Inc.**

- **Rotterdam-Rhine Pipeline Co.**

Project: 185-mile, 30-in. line from Rotterdam to Ruhr industrial area, West Germany, to supply refineries at Godorf, Wesseling, and Gelsenberg.

Status: Preliminary work under way.

Completion: 1960.

- **Yacimientos Petrolíferos Fiscales Bolivianos**

Project: 174 miles of 10-in. and 44 miles of 8-in. from Sicasica, Bolivia, to Arica, Chile.

Status: Under way.

Contractor: **Williams Brothers Co.**

Completion: November 1, 1958.

Foreign Products Pipelines

- **Empresa Nacional de Petroles Government of Chile** and **Cia de Petroles de-Chile (Copec), et al.**

Project: 75 miles of 10-in. from Chile's coastal refinery at Concon to Santiago.

Status: Planned.

Completion: 1958.

- **National Iranian Oil Co.**

Project: 90 miles of 12-in. from Abadan to Ahwaz, Iran.

Status: Under way.

Contractor: **Entrepose Co.,** Paris.

Completion: Summer 1958.

Project: 120 miles of 6-in. northward extension of its Abadan-Teheran system.

Status: Planned.

Contractor: **B. & M. Construction Corp.,** Oklahoma City.

- **Yacimientos Petroliferous Fiscales (Argentina).**

Project: 652 miles of 10-in. from Lujan de Cuyo to Buenos Aires.

Status: Bids to be opened August 1.

Foreign Natural-Gas Pipelines

- **Attock Oil Co.**

Project: 60 miles of line from Dhulian field to Rawalpindi in West Pakistan.

Status: Planned.

- **Cuban Gas Transmission Co.**

Project: 650-mile pipeline from Campeche area of Mexico across Yucatan and on the ocean floor to Havana, Cuba; 150 miles would be submarine.

Status: Being studied by Ebasco Services.

- **Ferngas**

Project: 45 miles of 12-in. from Semmering to Donawitz, Austria.

Status: Planned.

Contractor: **Mannesmann,** a German steel and construction firm.

Completion: 1958.

- **Gaz de France**

Project: 550 miles of 16 to 24-in. from Lacq field, southwestern France, to Paris, plus a 10-in. terminal to Nantes and 12 to 16-in. laterals to Lyons, making a 1,000-mile system.

Status: Under way.

Contractor: French contractors.

Completion: First stage in 1958; complete system in 1960.

- **NIOGAS**

Project: 160 miles of 6, 8, 10, and 12-in. from Fischamend field to Vienna and other Austrian cities.

Status: Under way.

Contractor: **Williams Brothers Co.** and **Costain-John Brown, Ltd.**

Completion: Fall 1958.

- **North Thames Gas Board**

Project: Will extend its Shellhaven-to-Romford line to Coryton then to Canvey Island.

Status: Planned.

Completion: Summer 1958.

- **Petroleos Mexicanos.**

Project: 130 miles of 22-in. to parallel a 14-in. line from Reynosa to Monterrey.

- **Sui Gas Transmission Co.**

Project: 130-mile extension of the new 310-mile, 16-in. Moultan-to-Sui, Pakistan, line. Extension will terminate at Lyallpur.

Status: Planned.

- **Technical Office of Hydrocarbon, Ministry of Mines and Petroleum, Government of Venezuela.**

Project: 63 miles of 20-in. westward from Caracas to Valencia and Puerto Cabello.

Status: Under way.

Contractor: **Petrogas, S. A.**

Completion: July 1958.

- **Union of Soviet Socialist Republic.**

Project: 808 miles of 26-in. from Stavropol in the Northern Caucasus to Moscow, to serve Voroshilovgrad, Voronezh, Tula, Yelets, and Serpukhov.

- **Yacimientos Petroliferos Fiscales (Argentina)**

Project: 1,015 miles of 24-in. from Camp Duran to Buenos Aires.

Status: To start July 1, 1958.

Contractor: **TIPSA** (Fish Engineering Corp., Fish Northwest Constructors, Inc., Clark Brothers, North American Utility, Construction International Co.)

Completion: Mid-1960.

Regular in-store buyers have a wider variety of products to choose from, and usually have fewer supply "emergencies" in the field.

What's the best value in a National Supply Store?

There are 65,000 different items stocked among our 131 stores, but the very best value isn't a product. It's the man behind the counter.

He is well-trained, experienced and practical. He is familiar with operating problems in the area which his store serves. In addition to this practical knowledge of field operations and equipment, he has at his fingertips a large amount of technical information that you may often find very helpful.

Most important of all, the man behind the National Store counter is friendly, courteous and helpful; eager to serve you from the complete stocks available in the store —and well-equipped with all that it takes to make that service of real value to you.

The National Store men in your area are good folks to know. If you don't already know them, it will pay you to stop in and get acquainted.

The centralized controls on National Supply's new diesel electric rigs are easy to operate.

New National DIESEL ELECTRIC Rig designed for drilling to 25,000 feet!

...especially suitable for offshore service!

Here's the big first in a new series of National Supply Rigs designed for electric application! It's the 1625DE, built for drilling from 16,000 to 25,000 feet, using 1⅜″ or 1½″ wire line, and utilizing 1,300 to 2,000 horsepower delivered through electric motor drives.

In the 1625DE, you'll find all the field-proved features of National Rig construction combined with a simplified, highly flexible power package. Because of its light weight and compact hook-up, this completely integrated drilling system is a natural for offshore service, where platform space is expensive.

National's 1625DE draw works is basically a one-piece design on an 18-inch beam base. Its front and rear sections are detachable for easy transportation, and it includes these outstanding features:

Centralized controls—The draw works' continuously variable control and rotary torque control are centralized and simplified for easy operation. The flexibility of electric power permits infinite speed control with fewer steps on the draw works.

This is one of the offshore platforms on which a National 1625DE Rig is in service.

Four hoisting speeds—Transmission shaft carries two drives to the drum, and motor drive rear section includes primary shaft with two selective speed chain drives. Drives are arranged to obtain most efficient use of power and insure fastest operation in line with good drilling practice. Two speeds are available to catheads (and sand reel, if used) and rotary drive.

Large integrally grooved spooling drum—36" x 61¼" drum permits hoisting 135 ft. stands of pipe with eight lines without spooling more than three layers on the drum . . . has National Spirallel Grooving, surface-hardened at points of wear.

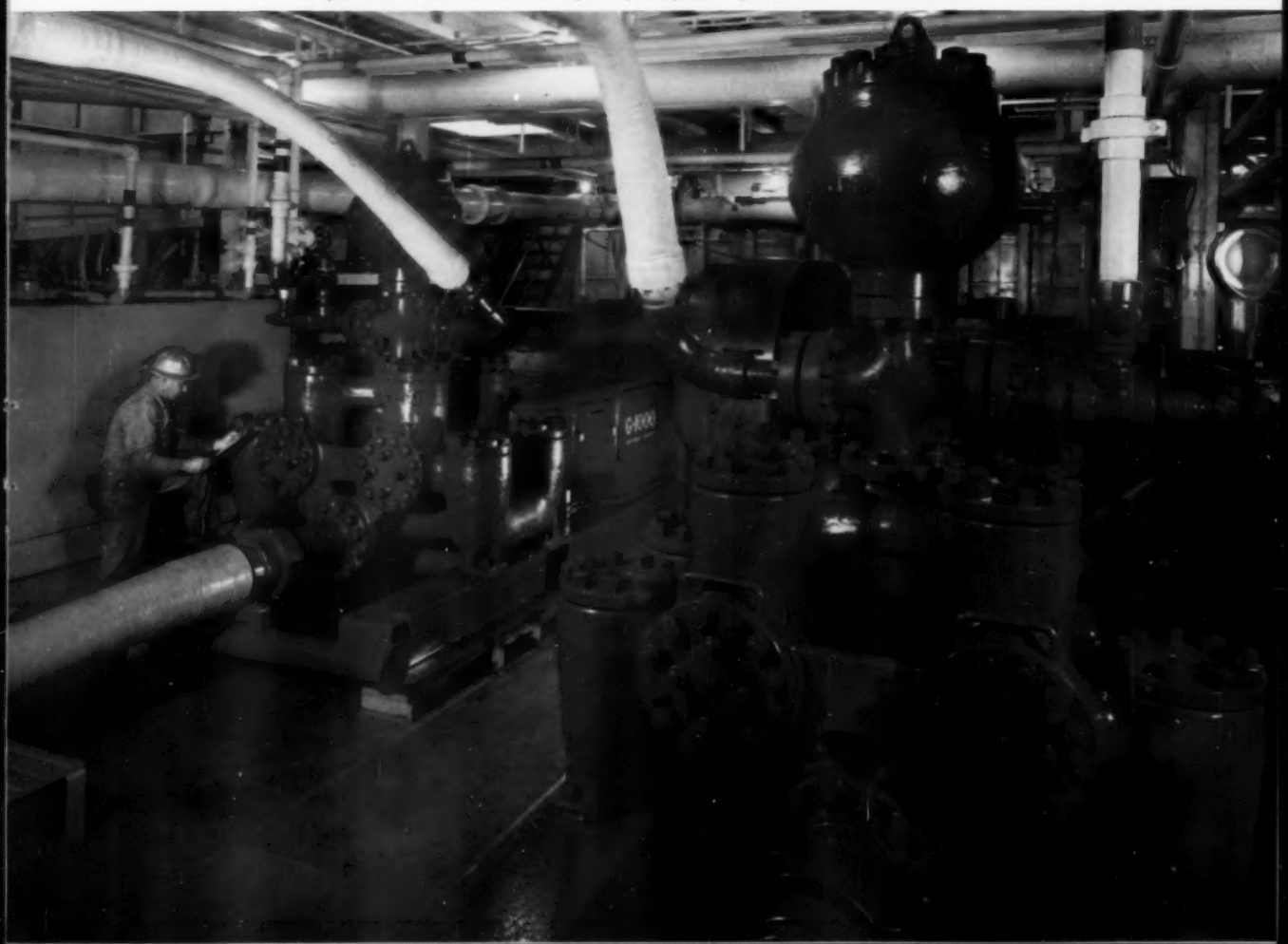
K-62 Compound Equalizing Brake—Designed especially for this size drum, this National drum brake is the most efficient one in the industry.

Air friction clutches—Used on the drum shaft to provide ease of operation and eliminate shock

continued next page

Overhead view of the rig at left shows more National equipment in service.

Dependable National Slush Pumps help keep mud system costs to a minimum.



New National DIESEL ELECTRIC Rig

(continued)

loading. A special National feature is a jaw clutch built inside the low drum clutch for standby purposes.

National Type A Catheads—Years of trouble-free service have proved the high quality of these important draw works elements.

Draw Works Electric Motor Drive—For the 1625DE, power may be two or three 625/650 h.p. DC motors or two 1,000 h.p. motors—coupled at the rear of the draw works.

NATIONAL 1320DE RIG ALSO AVAILABLE!

The 1320DE is another diesel electric draw works available in the National line. It is designed for drilling from 13,000 to 20,000 feet, and incorporates the same outstanding features of the 1625DE. For complete information on either of these rigs, contact the National Supply representative in your area.

This is the drive group section that complements the 1625DE shown on the previous pages. National Drive Groups are factory pre-aligned, easy to hook up and tear down. Each section is a completely self-contained unit and adaptable to any power source of appropriate size.

THE **NATIONAL SUPPLY** COMPANY

MAIN OFFICE: Two Gateway Center, Pittsburgh 22, Pa.

DIVISION OFFICES: Dallas; Denver; Houston; Toledo; Tulsa; Torrance

CANADA: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta

EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; City Wall House, Chiswell Street, London E. C. 1

NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT

SPANG STEEL PIPE AND ELECTRICAL CONDUIT

▶ ▶ ▶ Among the Drilling Contractors

This big diesel-electric drilling barge is slated for the Texas-Louisiana

Offshore drilling fleet

THE SECOND of two giant self-contained diesel-electric drilling barges built for Sea Drilling Corp., of New Orleans, is joining the massive array of offshore-drilling assemblies available for operation in the Gulf of Mexico off the Louisiana-Texas coast.

The barge unit, built and assembled in the yards of American Marine Corp. at New Orleans, is designated as Seadrill No. 2. It is the sister vessel of previously completed Seadrill No. 3. Owners also operate an offshore drilling tender, a converted LST.

It is designed for drilling in open water with depths up to 30 ft. Its hull is 180 ft. long with a 20 by 31-ft. drilling slot. It has four 35 by 38 by 9-ft. pontoons.

Drilling equipment centers on a National 23-10½ FE draw works, powered by two Elliott 900-hp. d.c. motors. Primary power is supplied by three 900-hp. General Motors 12-567 diesel engines, driving three 1,200 kw. Allis-Chalmers generators. There are two Emsco 8¼ by 18-in. mud pumps driven by 900-hp. motors. Rotation is by an Emsco 27½-in. rotary. The assembly uses a Lee C. Moore 142-ft. jackknife-type derrick. A Halliburton twin T-10 skid cementing unit also is permanent equipment.

A two-story air-conditioned quarter house provides living accommodations for 40 men.

Sea Drilling Corp., organized early in 1957, is headed by S. F. Rowan as president and director. Other directors include L. B. Durant, T. L. Kempner, and D. D. Harrington.

Who's getting the drilling contracts

K. L. Kellogg & Sons, Compton, Calif., is drilling on a new lower Stevens exploratory test for Hancock Oil Co. on the latter's Kern County Land Co. lease north of Gosford field, in Kern County, southern California. Projected depth is 9,750 ft.

Sunnyland Contracting Co., Rayne, La., has taken a contract for a 7,500-ft. wildcat test 6½ miles southeast of Waynesboro, in Wayne County, southeastern Mississippi. Operator is S. B. Daws, of Waynesboro, whose location is at 1 Howse, in 5-7n-6w.

P. M. Drilling Co., Denver, is contractor for a new Laramie basin wildcat in southeastern Wyoming. Location has been staked by Fred W. Hoffman of Cheyenne for the 1 UPRR-Mortenson, NW NW SW 31-15n-75w, Albany County. The well will go to the Cloverly - Cretaceous at about 3,300 ft. There has been no drilling in this depth classification in the area. Location is near Soda Lakes, 4 miles southeast of Big Hollow field, a shallow Muddy sand producer at 800-900 ft.

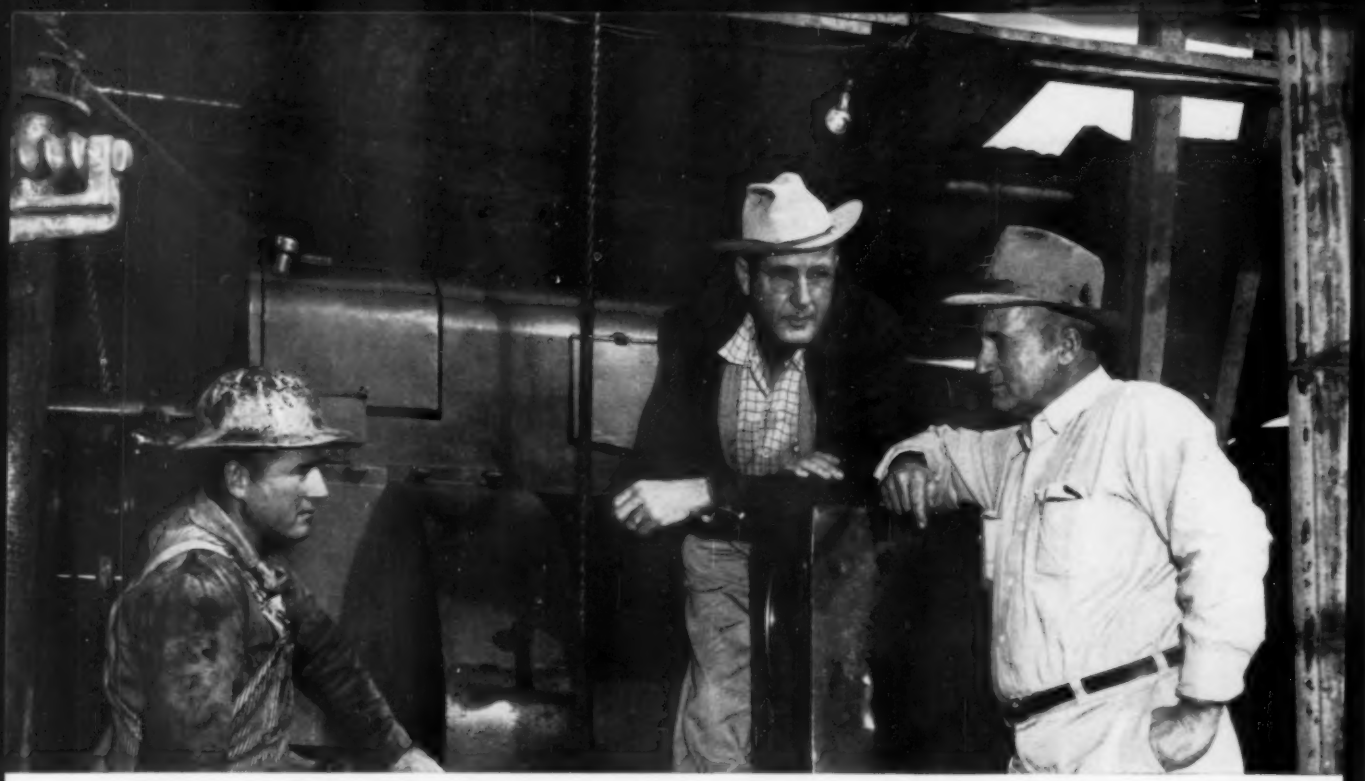
Brack Drilling Co., Fort Collins, Colorado, has contract for Anschutz Drilling Co. 1 Beeman, a Morgan County, Colorado, well in C SE SE 9-2n-55w. This Denver basin test will go to the Dakota-Cretaceous "D" sand. Location is Pinneo field. **Exeter Drilling Co.** also has contract for a well in this field. This Denver outfit is drilling for B. W. Vinson at 1 State in C SE SW 16-2n-55w. Another Denver basin wildcat going is **Allison Drilling Co.'s** contracted 1 Dutchess-Warner for C. T. McLaughlin et al. in Weld County. Location is C SW SW 23-4n-61w.

Jett Drilling Co. will handle contract for the 13,200-ft. Hosston well for Monsanto Chemical Co. at 1 Rathell, C NE NW NE 19-3n-4e, 2 miles west of Cato in Rankin County, Mississippi. Nearest deep test is about 6 miles west at Carter Oil Co. 1 F. J. B. Laughlin, C SW SW 20-3n-3e.

Crow Drilling & Producing Co., Shreveport, has contract for a 7,200-ft. Wilcox wildcat for Durbin Bond & Co. The new well is 1 Bridwell-James, in 6-4n-9e, located 1 mile north of Fairview field in Concordia Parish, Louisiana.

A. W. Williams Drilling Co. has been awarded contract for a 4,800-ft. south offset to Magnolia Petroleum Co.'s A-1 Snow discovery well of new Hope field in Monroe County, northeastern Mississippi. The Candif Oil Co. Inc., et al 1 J. B. Snow, SW NE 27-13s-7e, will test the Knox dolomite. Location is in the Black Warrior basin.

B. F. Allison Drilling Co., Denver, is getting under way on a basement, or 8,500-ft. test it has contracted to drill for Continental Oil Co. on the Ochate anticline prospect in Mora County, northeastern New Mexico. Location is at 1 Mares-Duran, in 14-23n-17e, about 5 miles west of Ochate. It is on the west side of Raton basin.



No signs of wear. Inspection of Tiger Brand Rope after drilling an 8600-foot well showed it to be in excellent condition with plenty of lubrication left.

"USS American Tiger Brand is as good a line as a man can find"

Says L. E. Fannin, Tool Pusher for Trio Drilling Co., Dallas, Texas

THE TRIO DRILLING CO. has four rigs—and they are all equipped with USS American Tiger Brand Wire Rope.

The tool pusher, Mr. L. E. Fannin, keeps accurate service records of each rope and checks the wear regularly. He says, "American Tiger Brand Wire Rope is hard to beat. It's as good a line as a man can find. That's why we use it on all our rigs."

This rig was strung with 1750 feet of 1⅛" 6 x 19 Tiger Brand Excellay Preformed Monitor with an Independent Wire Rope Core. Drilling Contractors all over the oil fields have found that this rope gives them the best service at least cost. It has a high tensile strength combined with an ability to resist heavy abrasive wear.

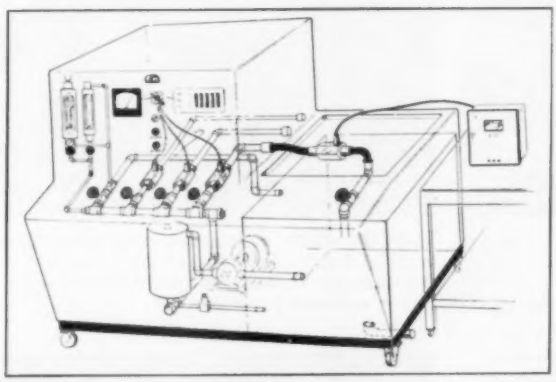
Why Tiger Brand gives you more for the money. With every Tiger Brand Wire Rope you get the results of years of basic research in steel making plus the application engineering of American Steel and Wire. What's more, the rope is produced under a rigid system of quality controls with plant facilities unsurpassed in the industry. These are the hidden elements that assure long service life and low wire rope costs. For more information, write to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio, or contact your local distributor.

USS is a registered trademark

American Steel & Wire
Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Export Company, Distributors Abroad

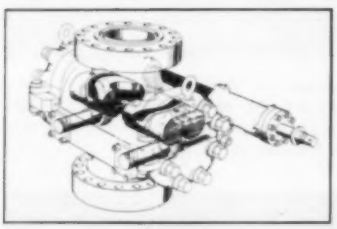
This week's SHOWCASE features . . .



Calibration stand tests flowmeter

. . . and employs turbine flowmeters as the calibrating standard. The stand uses water, hydrocarbons and/or oils as its calibrating medium. It is accurate to 0.5% of instantaneous flow rate. Range is from 0.5 to 150 g.p.m.

The packaged portable unit is capable of accurately calibrating all types of flowmeters, including variable area, turbine, positive-displacement, and orifice meters. The basic design is flexible to permit tailoring to individual requirements. Available accessories include temperature, viscosity, and density indicators; heating or cooling coils; filters; counters; and explosionproof construction. **Write or call: Fischer & Porter Co., 694 Jacksonville Road, Hatboro, Pa., for details on flowmeter calibration stand.**



Blowout preventer is compact

. . . in design. It is a combination pressure-operated, manual-closing type with a self-feeding ram.

In 7 and 11-in. extreme-pressure sizes, its body and bonnets are made of forged steel. The rams are stainless steel. They can be manually closed and/or locked with one handwheel. The shafts are packed at both ends. They are balanced under pressure.

Ram changing is easy and fast. When the bonnet bolts are loosened, the hinged bonnets swing open easily. The bolts stay in the bonnets. Six sizes of the Type F preventer are available. They range from a 7-in., 10,000-psi. w.p., 7⅛-in. bore with 10-in., 10,000 API flanges to a 20-in., 3,000-psi. w.p., 20¼-in. bore with 20-in., 3,000 API flanges. **Write or call: Cameron Iron Works, Inc., P. O. Box 1212, Houston, for details on Type F blowout preventer.**

Down-flow casing-perforation

. . . baffle changes the direction of flow of oil and gas as it enters casing perforations from upward to downward. The change in direction causes shale, sand, drilling mud, and oil to drop out of the gas stream and fall into the reservoir in the casing below the down-flow unit. The gas rises upward and enters a passage between the inside of the baffle and the tubing string. It then passes into the casing above the top of a sealing device.

The baffle sleeve attaches to the tubing string opposite casing perforations. According to the maker, the device will eliminate high working-fluid levels. It comes as a complete unit ready to install. It consists of a 2 or 2½-in. joint of tubing 30 ft. long with a 24-ft. length of 4-in. o.d. tubing skirted over it. The 4-in. tubing or sleeve is held in place by supports at the top and bottom.

The device which seals off space between the sleeve and casing is a rubber disk. It has no slips, triggers, or other setting mechanisms. Circulation can be carried on both ways around the unit. **Write or call: Korkele Production Engineering Co., P. O. Box 1127, Sterling, Colo., for details on down-flow casing-perforation baffle.**

Send this **Showcase Coupon**

to the Manufacturer of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

.....

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Described in OIL AND GAS JOURNAL - Issue of June 9, 1958

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

DATE.....

Up-To-Date Checklist of Dowell Acid Services–to Help You Solve Production Problems

Dowell acidized the first oil well, using inhibited hydrochloric acid, in 1932. Since then, Dowell engineers have encountered thousands of well stimulation problems where acid—properly modified and applied—proved to be the best method of increasing production. This experience has led to the development of a wide variety of improved acids, techniques and addition agents.

For example, Dowell has developed two acids with retarded action for wells producing from fast-reacting limestone pays. These acids are especially effective in vugular and oolitic formations; and in formations containing natural fractures, or exhibiting inter-crystalline porosity.

Where the producing formation is a dense slow-acting dolomite, wells often respond better to acid treatment if a Dowell intensifying agent is added.

Emulsions and silicate swelling need no longer restrict production following an acid job. Dowell has developed addition agents to combat these problems.

There is no need to rule out acid treatments if your well is producing from a sandstone. Many sands show good solubility in Mud Acid.

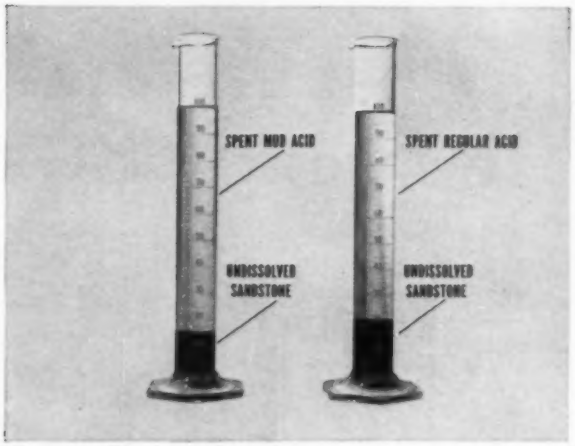
The search for improved chemicals and new acidizing techniques continues today at Dowell. Recently, Dowell worked with operators in the Mid-Continent and Permian Basin areas to perfect the use of magnesium pellets to heat acid, as the acid is pumped into producing formations. By creating heat in this manner, Dowell has been able to remove scale and deposits unaffected by other treatments.

When you specify Dowell you get the benefit of more years of experience in oil well acidizing than you can get from any other service company.

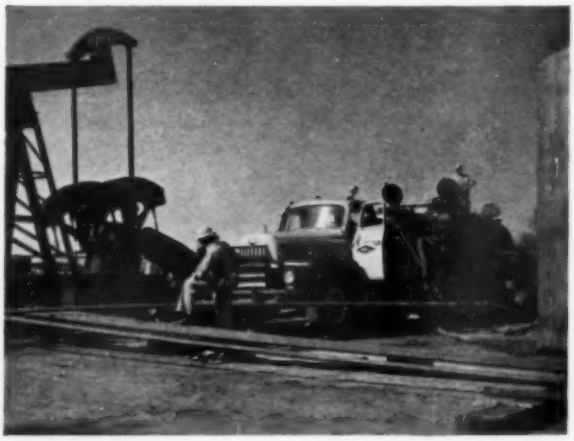
Dowell's major acid services are briefly described at the right. For service, call any of the 165 Dowell service points and offices. In Canada, contact Dowell of Canada, Ltd.; in Venezuela, contact United Oilwell Service. Or write Dowell, Tulsa 1, Oklahoma.

Services for the oil industry DOWELL

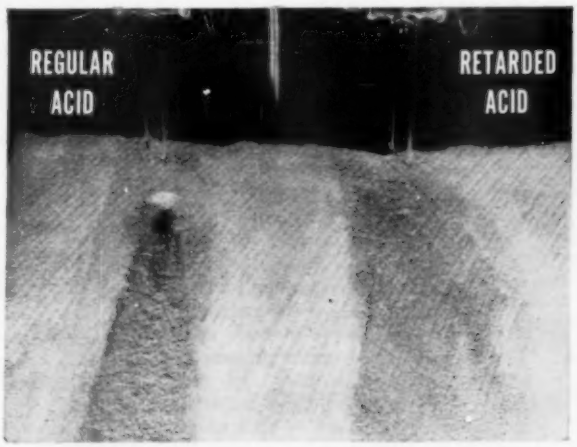
A SERVICE DIVISION OF THE DOW CHEMICAL COMPANY



1. MUD ACID contains a special fluoride compound designed to help dissolve and disintegrate clays and bentonites. It is recommended for use in mud removal operations and for acidizing certain sandstone formations.



4. XFWM ACID contains three agents designed to reduce surface tension, reduce silicate swelling and prevent emulsions. It is commonly used as a service by itself; but is also used as a spearhead with other treatments.



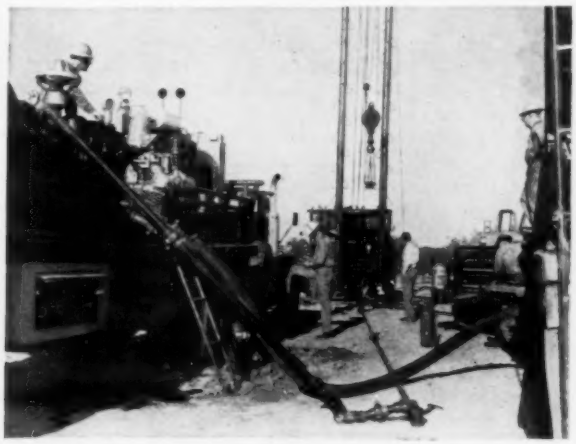
7. RETARDED ACID contains an addition agent that greatly slows down the acid action—as shown here. It is designed to create a deeper drainage area in fast-reacting limestone formations than does regular acid.

2. DOWELL REGULAR ACID is the basis for Dowell acidizing services. It is a 15 per cent by weight inhibited hydrochloric acid solution. One thousand gallons of regular Dowell acid will dissolve 10.8 cubic feet of pure limestone.

Sand Column Clean
Sand Column Plugged
BDA Acid Flowed Through Sand Column Carrying Most Of The Mud With It
Very Little Regular Acid And No Mud Passed Sand Column Due To Plugging Action Of Mud
BREAKDOWN ACID
REGULAR ACID

3. BREAKDOWN ACID (BDA*) contains agents that make it especially effective in breaking down and penetrating mud cake, and the formation. It is designed to be used as a spearhead for both fracturing and acidizing treatments.

5. SILICATE CONTROL ACID contains an agent designed to control the swelling of certain silicates, clays and bentonites. It is also effective in preventing or breaking oil-in-water emulsions that sometimes occur following an acid treatment.

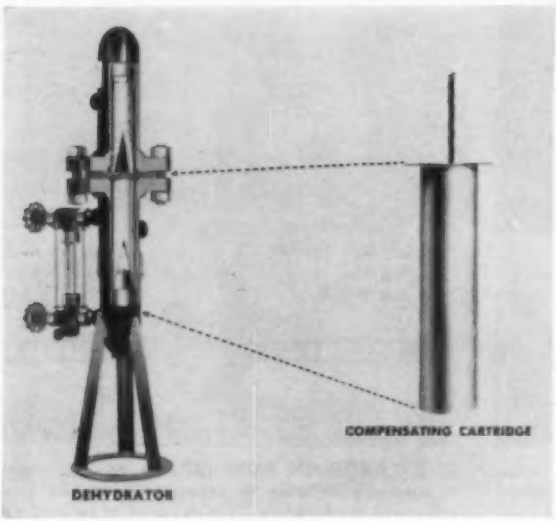


6. HEATBLAST is a new Dowell service designed to remove heavy hydrocarbons and mineral scales near the well bore by increasing the bottom hole temperature of the well. It uses a jel solution carrying magnesium pellets and a specially inhibited acid.

8. ACID PETROFRAC* is a Dowell fracturing service that uses an acid-oil emulsion as the fracturing fluid. This fluid, however, is often used on highly soluble formations—without sand—as a retarded acid.

9. STABILIZED ACID is designed to prevent the precipitation of iron hydroxide from spent acid. It is widely used to acidize waterflood input wells. It has also proved helpful in producing wells where iron salts are present.

*Dowell Trademark



Combined dehydrator-filter

. . . makes possible dew points of —150° F. and 5-micron filtration of air, gas, or liquid. The new unit comes with diameters of 2 to 8 in.

To obtain low dew points, a compensating cartridge is used. It consists mainly of a water-soluble chemical desiccant kept under constant spring pressure. The chemical dissipates on water contact. As it does so, the spring extends, eliminating voids and fissures.

The dehydrator is designed to prevent freezing and corrosion in such air-operated equipment as intermitter and control valves, and in gas engines, orifice meters, and LACT units. It's also suited for plant air systems and process streams. **Write or call: Dehydrators, Inc., P. O. Box 7359, Tulsa, for details on combination dehydrator-filter unit.**

●

Turbine meter, totalizer

. . . and printer system is now available for use in the transfer of petroleum products from pipelines to bulk tanks or loading racks to tank trucks. The system comprises a Pottermeter, a turbine type of flowmeter, and a ticket printer that features a sealed-in ticket which identifies the meter. The ticket shows the number of gallons delivered and the serial number of each transfer too.

Tickets are completely and automatically sealed in the printer. Mutilation results if a ticket is removed befor the finished delivery reading is printed.

The system comes either with an accumulative-total or a zero start system. In the accumulative system, the gallon reading is imprinted at the start and again at the finish of each transfer. The difference between the two figures gives gallons delivered. The zero-start system imprints zero gallons at the start of delivery, showing that the printer has been cleared. When the delivery has been completed, the total number of gallons delivered is then imprinted. **Write or call: Potter Aeronautical Corp., Route 22, Union, N. J., for details on turbine meter, totalizer, and printer.**

●

Swivel joint for high-pressure

. . . abrasive service is rated at 15,000-psi. test pressure. The joint's long radius permits smooth, well-directed full flow of fluids with minimum cavitation, the maker claims. The joint is made from forged alloy steel and heat treated to improve wearing surfaces.

Packing in the Long Sweep joint is designed to insure satisfactory operation under both positive and negative pressure. The packing cannot be sucked into the stream, regardless of the velocity of the flowing medium.

The swivel joint is available in a 2-in. size. Applications include cementing and fracturing operations and

Send this **Showcase Coupon**

to the Manufacturer of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

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Described in OIL AND GAS JOURNAL - Issue of June 9, 1958

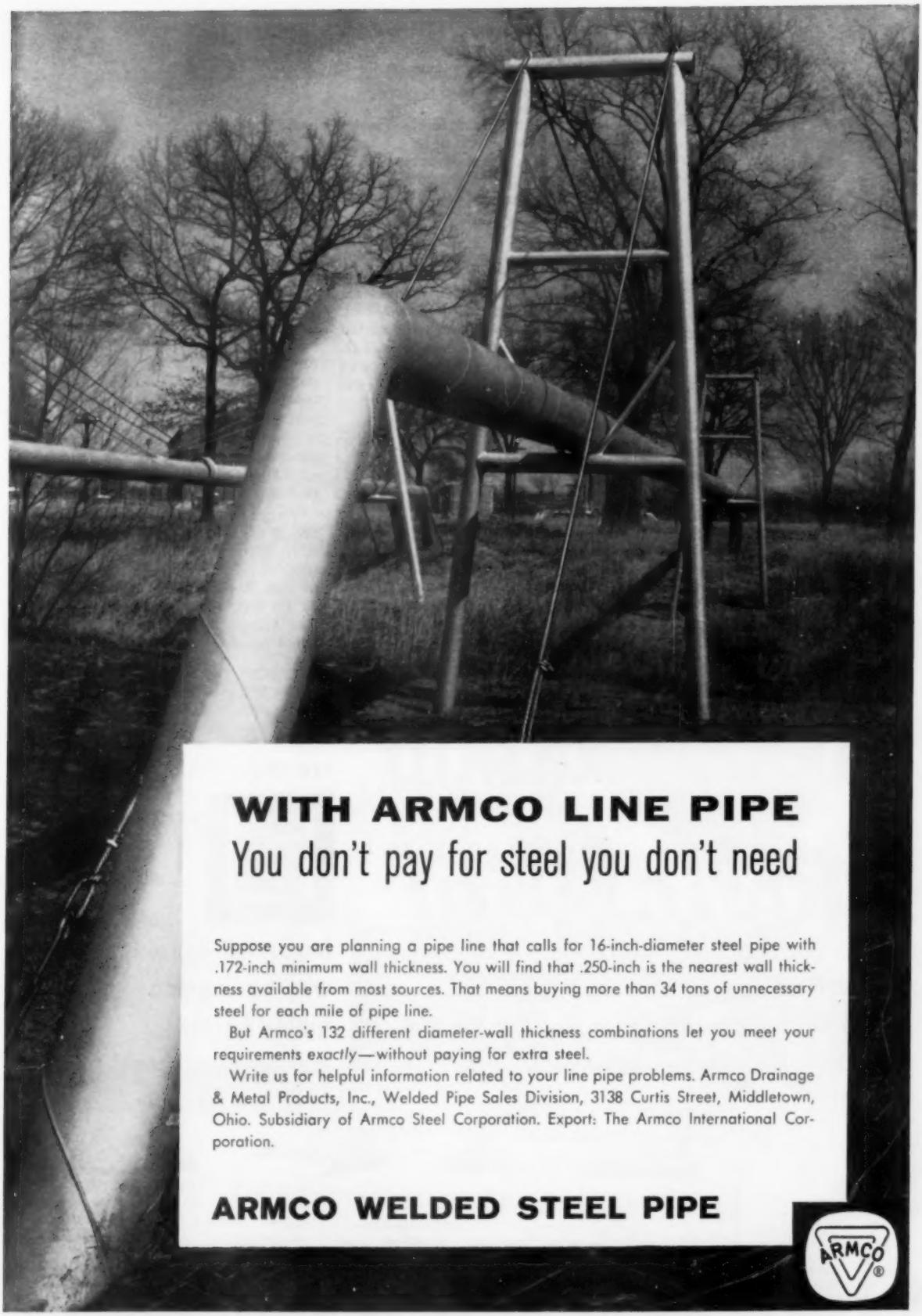
NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

DATE.....



WITH ARMCO LINE PIPE

You don't pay for steel you don't need

Suppose you are planning a pipe line that calls for 16-inch-diameter steel pipe with .172-inch minimum wall thickness. You will find that .250-inch is the nearest wall thickness available from most sources. That means buying more than 34 tons of unnecessary steel for each mile of pipe line.

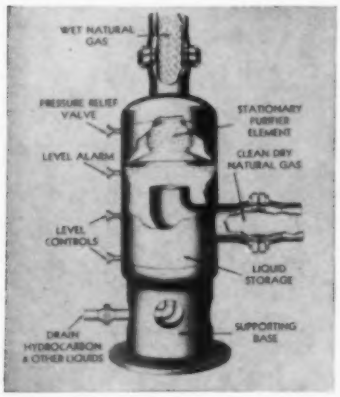
But Armco's 132 different diameter-wall thickness combinations let you meet your requirements *exactly*—without paying for extra steel.

Write us for helpful information related to your line pipe problems. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 3138 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO WELDED STEEL PIPE

ARMCO®

others where highly abrasive fluids must be pumped at high pressure through flexible lines. API line pipe threaded - end connections are used. **Write or call: Chiksan Co., Brea, Calif., for details on Long Sweep swivel joints.**



Gas scrubber has big reservoir

. . . capacity for intercepting large quantities of liquid entrainment. The new Hi-eF purifier, Type LG, is built for use in scrubbing natural gas at wellheads, processing plants, and compressor stations. Separation is accomplished by a patented turboaction scrubbing principle that separates out both large droplets of liquid and fine mist entrainment.

Two types are available. Type LGB has a supporting base for use where the pipeline will not support the unit. Type LG has no base. Both types have level controls, level alarm, and pressure-relief valves.

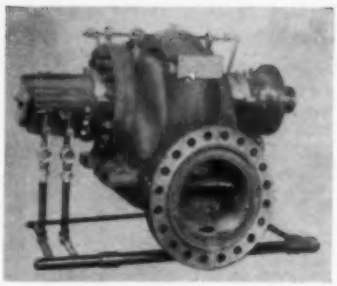
The units are made for pressure up to 1,000 psig. Pipeline sizes range from 2½ to 36 in. Each unit is built and stamped to the ASME Code for Unfired Pressure Vessel. Flanges are forged steel. Bodies are welded steel. Inlet and outlet nozzles can be scarfed for welding. **Write or call: Dept. LG, V. D. Anderson Co., 1935 West Ninety-sixth Street, Cleveland 2, for details on Hi-eF purifiers.**

•

Pipeline pump is gas-turbine driven

. . . and permits continuous, remote operation. The high - speed combustion-gas turbine is fueled by crude oil directly from the pipeline. It develops 5,000 hp. and drives pumps at 5,250 r.p.m.

The pump is expected to provide long operation without maintenance

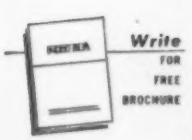


in remote areas. According to the maker, the pump can actually be run dry, if necessary, without damage. A Stellite coating on the wearing surfaces eliminates the need for impeller wear rings. The pump is a single-stage, double-volute, double-suction type. Head developed is 1,600 ft. under normal operating conditions. When the pump operates near a closed valve at the overspeed trip setting of 5,800 r.p.m., it develops a head of 2,600 ft.

Weighing 4,650 lb., the pump measures 5 ft. 1 in. long, 4 ft. wide, and 4 ft. high. A 500-lb. suction pressure on startup is permitted. **Write or call: Byron Jackson Pumps, Inc., P. O. Box 2017A Terminal Annex, Los Angeles 54, for details on high-speed pipeline pump.**

Workmanship
Reliability
Experience

are the 3 important reasons why Levingston builds better marine equipment



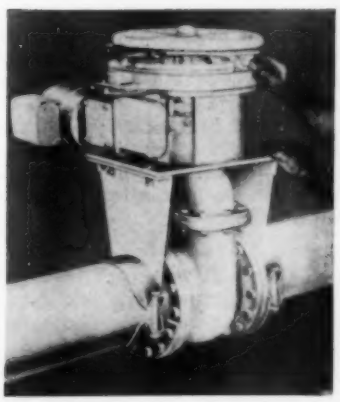
Levingston
SHIPBUILDING COMPANY • ORANGE, TEXAS

Roll-grooving tool for aluminum

. . . or lightwall steel pipe handles 2 to 6-in. diameters. Called Roll-A-Groove, it is made of malleable iron. Weight is 19 lb. The portable tool can be used in the field or shop.

To roll a groove, simply insert the pipe end over the lower roller, butt it tightly against a backup plate, then screw the upper roller down until it contacts the pipe surface. To complete the job, rotate the lower roller with a hand crank or power source. At the same time, lower the upper roller with a tee handle. Several quick revolutions of the pipe completes the groove. A crank, ratchet wrench, or power drive may be used for rolling grooves. **Write or call: Gustin-Bacon Manufacturing Co., 210 West Tenth Street, Kansas City, Mo., for details on Roll-A-Groove tool.**

•



New kit for converting valves

. . . from hand operation to electric-motor operation is now available. The unit can be installed without disturbing piping or replacing existing valves.

It operates with complete safety. Called Valvmatic, it's a push-button-operated, valve-actuating unit. Normal installation consists of six steps performed with ordinary tools. The kit can be used in most applications where the valve handle doesn't rise and where the valve handle can rotate when the valve is operating under power. If power fails, the valve can be manually operated by removing two pins.

Position and torque limits are provided in both directions of rotation. They prevent valve injury. The system can be moved from one valve to another. No special wiring is needed. **Write or call: C. H. Wheeler Mfg. Co., Nineteenth and Lehigh Avenue, Philadelphia 32, for details on valve-conversion unit.**

Aluminum paint takes 2,200° F.

. . . and dries in about 2 hours. Called Hi Temp 22, it is a ready mixed aluminum paint. It is intended for surfaces which reach temperatures in excess of 700° F. At 700° F., the paint fuses to the surface.

High in brilliance, it has good resistance to weather and industrial fumes, the maker reports. The formulas are available. One is sprayed on. The other is brush applied. **Write or call: United Laboratories, Inc., 16801 Euclid Avenue, Cleveland 12, for details on Hi Temp 22 aluminum paint.**

ROCKFORD

OIL FIELD TYPE

LONG LIFE
Heavy-Duty

POWER TAKE-OFF

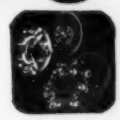
Designed to meet the needs of Oil Field and other rugged service—this ROCKFORD Extra Heavy-Duty POWER TAKE-OFF

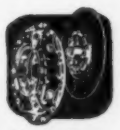
- Eliminates the Pilot Bearing
- Release and Main Bearings are lubricated for one year
- Main Bearings are 40,000 hour type
- Handles 5,000 pound Belt Loads
- Out-Board Bearings and Flexible Couplings eliminated
- Furnished with Single or Double Plate, Organic or Morlife® faced Gear tooth Type Clutches

Insure longer work life and reduce down-time with this NEW extra heavy-duty ROCKFORD POWER TAKE-OFF.

BW SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER
1305 Eighteenth Ave., Rockford, Ill., U.S.A.
Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.


Small Spring Loaded


Heavy Duty Spring Loaded

Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

Speed Reducers

CLUTCHES

DEMING PUMPS

proven performance in industry

Millions of gallons of water cascade over Niagara Falls daily . . . it's a tremendous sight. In industry too, millions of gallons of diversified liquids are pumped every day by Deming Pumps.

Dependable Deming Pumps are recognized throughout industry for their proven reliability and performance.

The complete Deming line provides a selection of more than 10,000 types, sizes and capacities to meet any industrial pumping requirement.

Depend on Deming . . . write for complete information.

THE DEMING COMPANY 559 BROADWAY, SALEM, OHIO

Please send me a copy of your Industrial Pump Bulletin I-57-E describing pumps for every industry.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

SHOWCASE . . .

New Literature

Woven-wire slings

. . . catalog is a 20-page booklet that describes the uses for woven-wire slings. The slings are made of a series of smooth, spiral wires joined together across the body of the sling. The booklet explains the sling's flexibility and how it enables the sling to bend around irregularly shaped loads and eliminates danger of gouging or marring edges of load members. Details are given on typical applications. **Write or call: Cambridge Wire Cloth Co., Cambridge, Md., for Woven Wire Slings catalog.**

Pump-plunger brochure

. . . describes the new Axite hard-faced subsurface plunger. The subsurface plunger is said to be nongalling and to highly resist corrosion and abrasion. Its hardness approaches that of diamonds. **Write or call: Axelson Mfg. Co., Div., of U. S. Industries, Inc., 6150 South Boyle Avenue, Los Angeles 58, for Axite plunger brochure.**

Positive-displacement meters

. . . for crude and product pipelines, loading racks, and refineries are detailed in new eight-page Bulletin 658. The booklet details both operating and mechanical specifications for 34 models in capacities from 40 g.p.m. to 5,500 bbl./hour and pressures from 125 to 1,200 psi. For simplified reference, models are arranged in six groups according to basic designs and capacity ranges. Capacities and pressures are listed in U. S. and other standard equivalents. Connections, dimensional drawings, weights, materials, and pressure-drop curves are included. **Write or call: Ralph N. Brodie Co., San Leandro, Calif., for Bulletin 658.**

Industrial TV equipment

. . . now available for business and industry is described in a new eight-page brochure. It shows different types of cameras, control units, monitors, accessories, and projection systems. **Write or call: General Precision Laboratory, 63 Bedford Road, Pleasantville, N. Y., for Industrial Television Equipment bulletin.**

Indicating flowmeters

. . . are described in new two-color Bulletin V-100. Included in the bulletin are ranges, scales, pressures, and mechanical details. The flowmeters

are usable with air, gas, or liquids. The bulletin also explains the movable-valve principle of the flowmeters and the three systems of indication used in the various mediums. It includes dimensions and mounting arrangements for the meters. **Write or call: Eclipse Fuel Engineering Co., Seico Instrument Div., Rockford, Ill., for Bulletin V-100.**

Getting maximum service

. . . out of off-the-road tires is described in a new 52-page handbook. Four factors in off-the-road tires, all within control of the equipment operator or owner, are discussed in the handbook. The factors are: load, inflation, operating conditions, and tire care. Included are data on load and inflation, weights and measures, tire specifications for 1957 motor graders, self-propelled and tractor-drawn scrapers, plus valve and rim information. **Write or call: B. F. Goodrich Tire Co., Akron, for Off-The-Road Tires handbook.**

Portable oxygen-indicator

. . . features and performance data are presented in a new four-page bulletin. The illustrated bulletin includes principles of operations, uses, and accessories for the new portable oxygen indicator. **Write or call: Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh 8, for Bulletin 0817-1.**

Water-treatment equipment

. . . Bulletin 4433 (12-pages) lists water impurities and methods of treatment and illustrates typical treatment systems. It describes aerators, deaerators, precipitation equipment, filters, and ion-exchange equipment. And it tells how each piece operates and gives its advantages, limitations, and range of flow rates. **Write or call: Permutit Co., 50 West Forty-fourth Street, New York 36, for Bulletin 4433.**

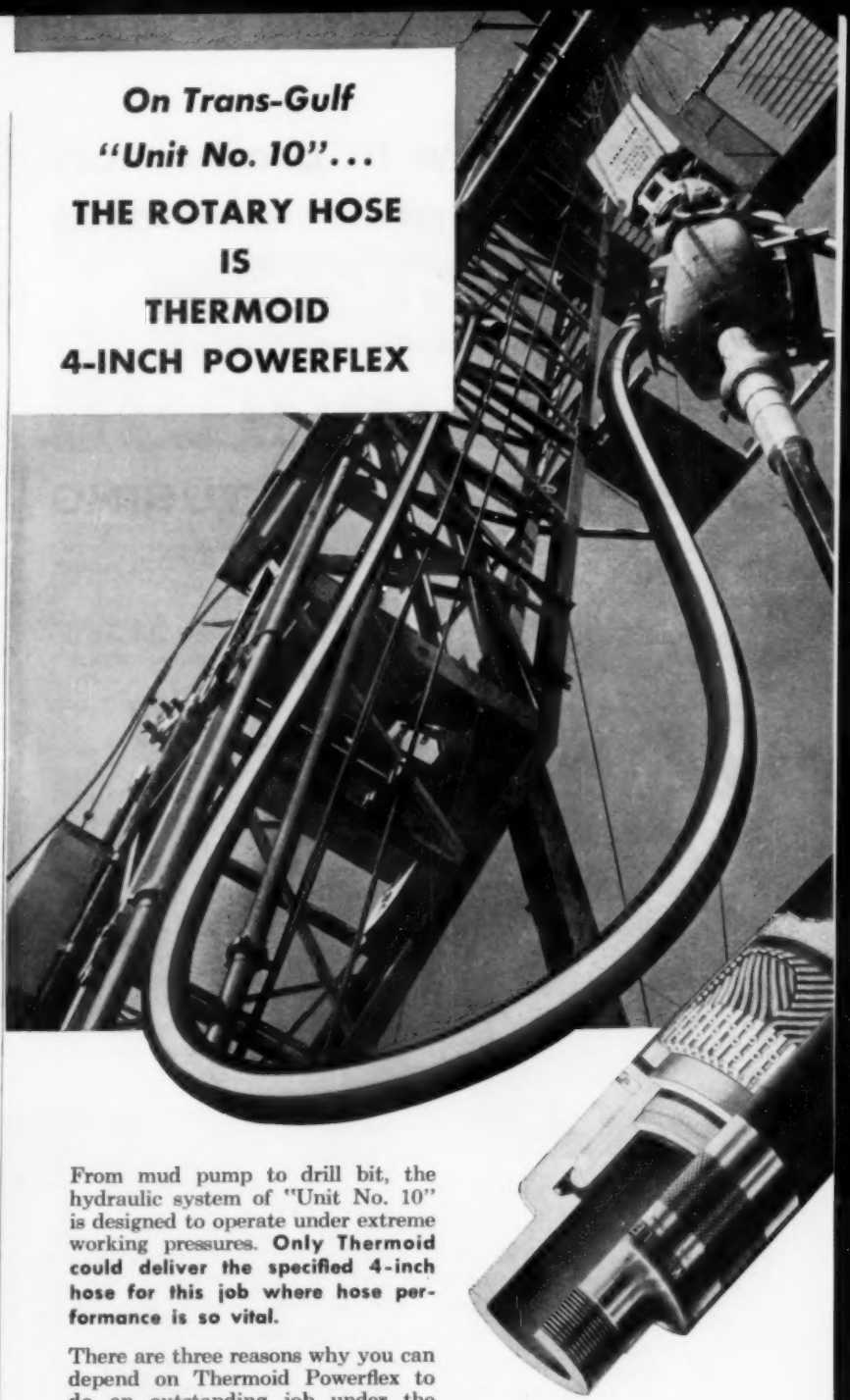
Scaffolding Bulletin PTS-18R

. . . contains a complete description, installation instructions, engineering data, and a broad range of uses for TubeLox scaffolding in construction, maintenance, and repair work. The 12-page bulletin features applications and detailed technical drawings. **Write or call: Patent Scaffolding Co., Inc., 38-21 Twelfth Street, Long Island City 1, N. Y., for Bulletin PTS-18R.**

Hydraulic line tubing

. . . brochure outlines the advantages of a company's electric-resistance-welded hydraulic-line tubing. The 10-

On Trans-Gulf "Unit No. 10"... THE ROTARY HOSE IS THERMOID 4-INCH POWERFLEX



From mud pump to drill bit, the hydraulic system of "Unit No. 10" is designed to operate under extreme working pressures. **Only Thermoid could deliver the specified 4-inch hose for this job where hose performance is so vital.**

There are three reasons why you can depend on Thermoid Powerflex to do an outstanding job under the toughest conditions. *First* . . . the patented full flow coupling is an integral part of the cable. It cannot leak or pull off. *Second* . . . the cable itself is made up of 33 miles of high tensile steel wire wrapped and counterwrapped for unexcelled strength and flexibility. *Third* . . . the tube and cover of Powerflex Hose are made with oil and abrasion resistant Neoprene, reinforced with impregnated multi-ply woven fabric.

Superior design and superior construction make Thermoid Oil Field Products the right choice for you . . . for both routine and unusual jobs.

Thermoid

Thermoid Company
Trenton, N. J. • Nephi, Utah

Warehouses:
Dallas, Houston, Odessa, Abilene, Texas; Houma, La.; Oklahoma City, Okla.; St. Louis, Mo.; Great Bend, Kan.; Casper, Wyo.; Los Angeles, Calif.

Now in production
by popular demand

4½" O.D. Fibercast

LINE PIPE & WELL TUBING

Proof that Fibercast has all the desired qualities we've claimed for it is the increasing demand for a larger size. An extensive study was made in the several industries where 2⅜", 2⅞" and 3½" Fibercast has reduced piping costs through taming corrosion. It was found that the 4½" size is much in demand. So 4½" Fibercast is now in production! Deliveries started in June and production slated for full capacity in July. We urge you to get all the facts and data on Fibercast . . . the pipe that will not corrode!

Here are a few other Fibercast money-saving advantages:

- Lightness — minimum installation cost
- Easy fabrication on location
- Takes high temperatures
- 18-ft. support span
- 20-ft. joint lengths
- Standard iron pipe O.D.
- Standard A.S.A. flanges

WELL TUBING Fibercast LINE PIPE

MANUFACTURERS OF NON-CORROSIVE PIPE AND FITTINGS

FIBERCAST COMPANY

A Division of The Youngstown Sheet and Tube Company
Box 727, Sand Springs, Oklahoma
Phone Circle 5-1301 TWX—Sand Springs 480

page brochure highlights how the fatigue-resisting pressure tubing for hydraulic line service can be easily and uniformly bent and how it can be flared and assembled. Included are a complete list of specifications and a table of recommended working pressures and size ranges. **Write or call: Republic Steel Corp., Steel & Tubes Div., 224 East 131st Street, Cleveland 8, Ohio, for Line Tubing brochure.**

Compressors and gas

. . . turbines composite catalog features line of standard Clark products. The 40-page catalog highlights the latest engineering and performance data with reference to the petroleum, refining, gas, pipeline, chemical, petrochemical, and other industrial applications. A section on reciprocating compressors gives detailed specifications and diagrams of gas-engine, steam engine, and electric-motor-driven units. A section on centrifugal compressors details vertically and horizontally split, multistage units. Pipeline, axial-flow compressors and radial inflow expanders are also featured. A section on gas turbines covers models in the 1,150 to 9,300-hp. range. **Write or call: Clark Bros. Co., 701 Lincoln Avenue, Olean, N. Y., for Catalog 151.**

Packless valves

. . . for high-temperature applications are reviewed in new four-page Bulletin 10-57. It describes several valves designed for efficient control of radioactive material which may be in the form of corrosive fused salts or liquid metals. Assembly drawings, outlines of special design features, and suggested applications are shown. **Write or call: Hoke, Inc., 136 South Dean Street, Englewood, N. J., for Bulletin 10-57.**

Oil-equipment catalog

. . . contains full information and specifications on bulk-plant and truck-tank equipment. A new price list is also included. It features a special loose-leaf binding and finger index. **Write or call: Oil Equipment Div., A. Y. McDonald Mfg. Co., Dubuque, Iowa, for Oil Equipment catalog.**

Proportioning pumps

. . . are reviewed in new eight-page Catalog 604. The catalog covers the details and specifications of a full line of proportioning pumps offered by the company. Maximum capacities of pumps covered range from 6 cc. per minute to 730 g.p.h. per feed. **Write or call: Hills-McCana Co., 4606 West Touhy Avenue, Chicago 30, for Bulletin 604.**

G. P. Lacy named vice prexy, general sales mgr.

G. P. LACY

. . . of wire and wire rope products at Union Wire Rope Corp., a subsidiary of Armco Steel Corp. Other executive changes are J. H. Hatch, vice president and production manager, became president and general manager, succeeding M. G. Ensinger who has retired. Maurice B. Hansell, Jr., has assumed the position of vice president and production manager. L. G. Schraub, who was vice president and general sales manager, has retired from active duty with the company.

Lacy had been with Armco's Sheffield steel division for 22 years. For 10 years he has been in sales management. He joined Union Wire Rope earlier this year when the company was merged with Armco.

Westinghouse establishes new microwave center

. . . in Ithaca, N. Y. The facility is a branch of the electronic tube division in Elmira, N. Y.

The center will do research and development for new microwave tubes and devices in anticipation of future systems requirements. It will also render consultation services to the electronic tube division's microwave tube section and its Baltimore, Md., applied research laboratory on microwave tube problems.

Ernest C. Okress has been named manager. Phillippe Clavier has been named project manager of colinear types of noncrossed field microwave tubes. The center will work directly with the Armed Services in addition to its work for the company.

Macco Oil Tool Co., Inc., holds annual sales meet

. . . in Houston recently. Representatives who attended are, front row: R. P. Kirk, Odessa, Tex.; Doug Clairbourne, Shreveport, La.; Oris Orton, Alice, Tex.; Harry Ellington, Shreveport; Jean Deligans, Houma, La.; W. C. Carlisle, president; J. H. McCarvell, vice president; R. Z. Mendenhall, sales manager; Red Motes, Shreveport; J. D. Kent, Houston; and H. D. Brewer, Houston.

Back row are: Bill Deligans, Houma; Max Threadgill, Houston; Cliff Greene, Houston; Ward Haggard, Beaumont, Tex.; John Witherspoon, Victoria, Tex.; Joe Rosett, Shreveport; Don Witherspoon, Victoria; Al Fischer, Oklahoma City; Flint Berlin, Corpus Christi, Tex.; Billy Grau, Shreveport; Ed Crowell, Houston; Buddy LaFour, Houston; and Tommy Atkins, Houston.

R. W. Eiler, A. R. Meyer elected vice presidents

. . . of The National Supply Co. Both men are members of the new board of directors of National Supply.

Eiler started with the company in

R. W. EILER

A. R. MEYER

1937 as general attorney after practicing law with firms of Chicago and Pittsburgh and conducting a private practice in Pittsburgh. He was elected secretary of the company in 1939.

Meyer joined the company's sales department in 1929. He was named assistant manager of export sales in 1949, and became division manager of the export division in 1952.

Los Angeles Nomads host international guests

. . . at the monthly meeting in May. Standing are L. G. Cook of H. C. Smith Oil Tools from Venezuela; Leo L. Olson of United Geophysical Corp. from France; Jim Baker of Iraq Petroleum Co. from Iran; Jess Roberts of Santa Fe Drilling from Philippines; H. W. Flock of Santa Fe Drilling from Venezuela; C. C. Cantin of Haney & Williams from Brazil; Karl Jauman of Santa Fe Drilling from Kuwait; and W. A. Sawyer of Santa Fe Drilling from New Guinea.

Middle row are Mark R. Teague of Iraq Petroleum Co. from Iraq; Bill Taggert of Iraq Petroleum Co. from Persian Gulf; Chas. LaMar of D.M.J.&M. going to Thailand; C. H. Strickland of Iraq Petroleum Co. from Qatar; and Speaker Gilbert Magill of Rotor-Craft Corp.

Front row are A. R. Crossen of Basrah Petroleum Co. from Iraq; Joe Atkins of Iraq Petroleum Co. from Iraq; Ike Ridenhour of Madca from Venezuela; Raimundo Galletti of Y.P.F. from Argentina; and Mahmoud Adasani from Kuwait.

Welex, Inc., appoints H. B. Lee, C. F. Moore

. . . vice president in charge of operations and assistant treasurer, respectively, according to Ray O. Shaffer, president.

Lee has been in oil-field service work for the past 20 years. He has been with Welex since October 1957 and served as assistant operations manager and manager of the operations department.

Moore has more than 17 years'

experience in oil-field service and came to Welex as chief accountant in October 1957.

Broderick & Bascom Rope Co. appoints P. D. Moon

P. D. MOON

. . . to manager of sales promotion, announces J. J. Sieber, vice president, sales.

Moon has 17 years of sales experience in construction, oil field, logging, and industrial markets. From a construction equipment distributor in Louisiana, he came to B & B in 1954 as district representative in the territory of Texas, Oklahoma, and Kansas.

He became export manager in 1956. In his new position he will be in charge of advertising and sales promotion for Yellow Strand products in all markets.

George T. Born has been named product manager of American Logging Tool Corp. and Rixford Tool Division, a wholly owned subsidiary of B & B.

Oil Well Supply Division transfers Hiatt, Lathrop

. . . according to M. F. Jones, Gulf Coast area manager of the division of U. S. Steel Corp.

W. H. Hiatt, district engineer, machinery and equipment sales and services, moves from New Orleans, La., to Jackson, Miss. C. T. Lathrop, Jr., assistant district engineer, machinery and equipment sales and services, shifts from Harvey, La., to New Orleans.

Hiatt joined Oilwell in 1948 at Alice, Tex. He became assistant district engineer in 1949 at Beaumont, Tex., and was transferred in 1950 to Lake Charles, La. He was named district engineer, machinery and equipment sales and service there in 1952 and moved to New Orleans in 1956.

Lathrop was employed by Oilwell in 1956 as an engineer trainee and appointed to his position at Harvey in May 1957.

Enardo opens warehouse

. . . in Odessa, Tex., Frank DeLarsalear, sales manager, has announced.

Bud Lee, veteran Enardo Manufacturing Co. salesman in the West Texas area, will be in charge of the warehouse, which will stock a full line of Enardo products.

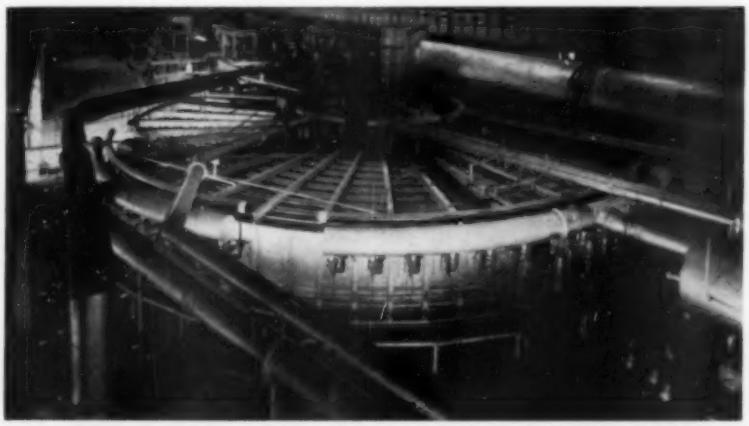
Streamlined automatic seamless pipe mill unveiled

. . . by The Youngstown Sheet & Tube Co. at its Indian Harbor Works, East Chicago, Ill., is push-button operated. It will manufacture oil country tubular products from 4½ to 9⅝-in. o.d.

One of the outstanding of its many automatic features is a giant doughnut-shaped rotary hearth furnace designed to heat 190 solid steel billets an hour to a temperature of 2,250°. Modern quality control equipment and methods, including the latest testing and inspection devices, X-ray machines, and automatic centralized lubrication systems also are employed. The equipment to make the pipe is in a two-part building large enough for seven football fields. The mill is powered by 1,225 electrical motors varying in horsepower from 1/10 to 4,000. There are 845 individual table conveyor motors to drive the rolls that transport the pipe from one operation to another.

Rounded steel billets are charged into the rotary hearth furnace. It is then conveyed to the first piercing operation where it is rotated and horizontally advanced between oblique rolls. That causes the hot steel to inwardly separate and form a center cavity. This cavity clears the way for a mandrel which completes the piercing operation. A second piercing mill elongates the shell, reduces the wall thickness and increases the outside diameter. After reheating, the billet is shifted to a plug mill for further rolling. The wall is further reduced to finished thickness by rolling the hollow bar over a round plug. A rolling operation smooths inside and outside surfaces.

The pipe is then passed to a cooling bed, heated for normalizing, cooled again, and passed through a rotary straightener, then inspected for size, wall thickness, concentricity, and surface quality. After passing through cut-off machines, threaders, or other finishing machines, hydrostatic tests are made.



The rotary furnace is the initial manufacturing process in the new number three seamless pipe mill of Youngstown Sheet & Tube. It has six heating zones and burns coke, oven gas, or oil.

Dresser Manufacturing Div. names Lew B. Phillips

L. B. PHILLIPS

. . . district manager, gas industry sales for the Great Plains states with headquarters in Kansas City, Mo., according to Donald V. Hackett, gas market manager.

Phillips was formerly employed by Moorlane Co. as a sales engineer. He was also a senior salesman for National Cash Register Co.

Dresser Manufacturing is one of the Dresser Industries, Inc.

C. E. Decker, Jr., named

. . . as wire rope engineer, Bethlehem Steel Co., with headquarters at its Tulsa office.

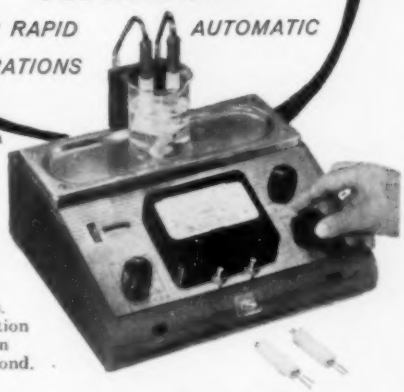
He replaces T. H. Gibbs who has been appointed wire rope salesman at Tulsa.

American Iron & Machine Works Co., Inc., assigns

. . . Jim Taylor, export manager, to director of export sales. To his staff will be added an eastern director of export sales and a sales engineer. His headquarters will be in New York, but he will do extensive traveling to direct American Iron's export market.

Jerry Burney, sales representative,

CENCO®
COULOMETRIC TITRATOR
FOR RAPID AUTOMATIC TITRATIONS



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Write for Bulletin 1264A.

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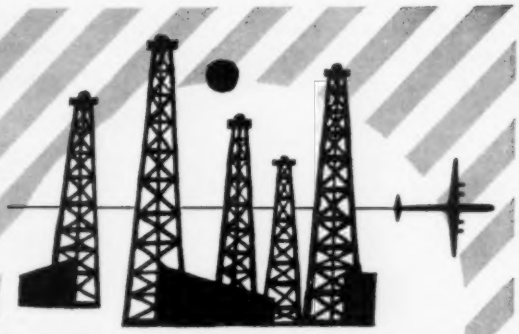

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From Houston, New York or Miami!

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THE WORLD OVER
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ROYAL DUTCH AIRLINES

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KLM Royal Dutch Airlines
430 Park Ave.
New York 22, N. Y.

has been re-assigned to the Abilene, Tex., area. Previously, he had been working out of Wichita, Kans.

Weksler Instruments Corp. names N. C. Munisteri

. . . as assistant to the vice president in charge of sales.

Munisteri most recently served with Tagliabue Division of Weston Electrical Instrument Corp. as division sales manager, after over 30 years' with C. J. Tagliabue Co. of Brooklyn, N. Y.

Weksler manufactures instruments for indicating and recording temperature, pressure, and humidity.

Barge designed to set or remove offshore platforms

. . . has been delivered to Coastal Marine & Construction Corp. The hinged portion, which is used to lower the platform, is shown being submerged under control of four hydraulic rams. Horizontal locking pins are actuated by Joe Stine cylinders. All ballast and flooding valves are controlled by Joe Stine operators.

The hydraulic control console designed and built by Joe Stine, Inc., for platform setting is shown at lower center. From this central panel submerging rams, locking, pins, ballast, and flooding valves are controlled.

R. F. McCormick named technical research manager

R. F. McCORMICK

. . . of the research and development division of The J. B. Beaird Co., Inc., John MacKinnon, director has announced. McCormick was formerly chief engineer in charge of research and development in the controls division of Black, Sivalls & Bryson, Inc.

Previously, he served as chief engineer of the gasoline and oil meter department of Rockwell Manufacturing Co. He has also served with Brown Co., S. D. Hicks & Sons, Inc., Foster Wheeler Corp., and Phillips Petroleum Co.

W. H. Royal joins sales department

. . . of M. J. Crose Manufacturing Co., Inc., according to T. J. Behrenfeld, vice president and sales manager. He will headquarter in Tulsa.

Royal joins Crose after 11 years with Browning-Ferris Machinery Co. in Houston. He was assistant sales manager for that company the past 3 years.

Schlumberger sets up marketing organization

. . . for its Model 104 nuclear magnetic (NMR) analyzer, announces A. Russell Aikman, Schlumberger Well Surveying Corp.'s marketing director. The Model 104 is produced by Schlumberger's Ridgefield Instrumentation Division.

Charles Morgan, assisting Aikman as sales manager, will be in charge of this nation-wide organization. Morgan will operate out of the main office at Ridgefield, Conn.

These companies will take part in the distribution of the NMR analyzer: J. J. Maguire Co. for Washington, D. C., and South Atlantic states; Alantex Corp. for New England; Harshaw Scientific Division of Harshaw Chemical Co. for Central states; Van Waters & Rogers, Inc., Scientific Supplies Co. Division, Braun-Knecht-Heimann Co. Division, and Braun Corp. Division for Far West; and Pitchford Scientific Instruments Corp. for western Pennsylvania.

The NMR analyzer is used to determine the tightness of moisture binding, to measure the crystallinity of polymers, or to chart the migration of water in permeable solids.

Warren W. Hinton shifts to sales and service

. . . at Brookhaven, Miss., according to an announcement from the domestic oil tool division of Cameron Iron Works, Inc. He has been in Cameron's sales and service since 1954.

He first started in the oil industry with Gulf Oil Corp. and later served in the drilling department of Delta Drilling Co. and B. G. Byars Drilling Co. in Tyler, Tex.

Richard V. Gregory named

. . . as district manager operating out of a regional office at Minneapolis, Minn., by OPW Corp.

He will work with jobbers, distributors, original equipment manufacturers, and refineries in Wisconsin, North Dakota, South Dakota, and Minnesota.

LEASE AUTOMATION EQUIPMENT

Enardo introduces a new line of lease automation equipment. Get efficient, dependable, money-saving operation with these products:

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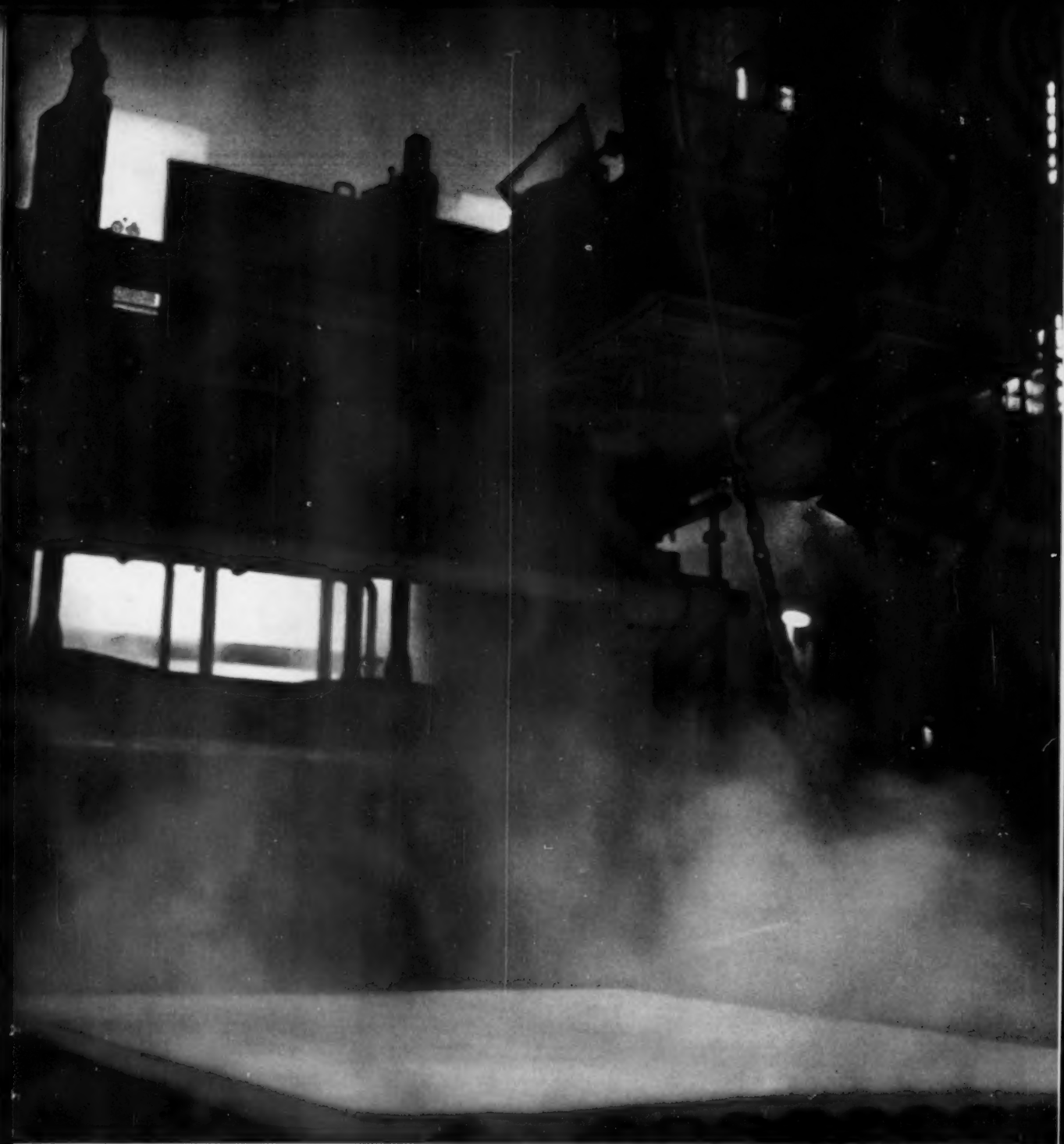

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Location: Drilled for major oil company in Gulf of Mexico, east of Mustang Island.

Detail: Well A2 – 7" casing run to 11,009 ft. in 8½" hole; cemented with 33,088 lb. **Unaflo** plus 16,700 lb. Barite with 0.18% by wgt. cement of Lignox retarder. Slurry weight 17.3 lb. per gal. Static BHT – 280°F.

Well A3–7" casing cemented at 10,755 ft. in 8½" hole; cemented with 32,994 lb. **Unaflo,** 11,700 lb. Barite; slurry wgt. 17 lb. per gal. Static BHT – 280°F.

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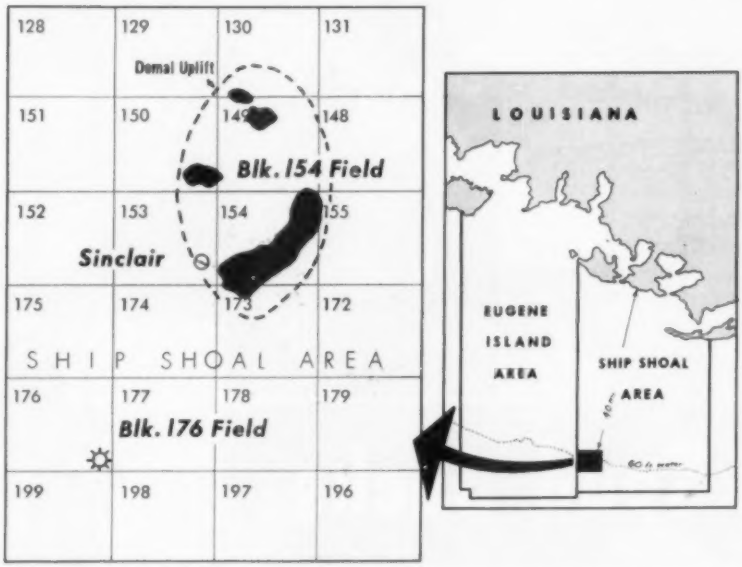


SHIP SHOAL area's Block 154 field has been partially developed with 66 wells; of these, 31 were dry, 1 made a gas well, and 34 were oil wells. Sinclair Oil & Gas Co. is now trying to extend the field limits southwest into Block 153.

Salt-water plums await the picking

BY FRANK J. GARDNER

ELSEWHERE in this issue (page 103), you'll find an interesting batch of statistics on our offshore oil industry. They bring us up to date on what's been done in drilling out in the waters of the Gulf of Mexico.

Figures are revealing . . . The outstanding thing reflected by these figures is the small amount of development drilling that's been done. Of 124 fields discovered up to May 1, (114 off Louisiana and 10 off Texas), only 10 have more than 50 wells and only 34 have more than 10 wells.

This means that a whale of a lot of drilling lies ahead before we can say that our offshore exploration program is in full swing. Wildcatting up to this point has aimed chiefly at proving the productivity of the structure and as the figures show, very few fields have been even semideveloped.

A host of targets . . . The current lull in offshore drilling activity most certainly is a temporary thing. When it will pick up is anybody's guess. But when it does, there will be no shortage of targets for the bit. No piercement-salt-dome structure is ever fully developed. Operators at Spindletop are still finding new fault segments and unsuspected reservoirs 57 years after the original discovery. One can only imagine, then, the vast amount of oil that lies untapped in the offshore areas.

Like this one . . . Let's take a look at just one of the partially developed fields. Shown on the map is the Block 154 field in the Ship Shoal area. This one made headlines upon its discovery in August 1955, for it was at that time the farthest offshore strike. It lies 40 miles south of the shore line of Terrebonne Parish.

The principal operator in Block 154 is Gulf Refining Co. After drilling one dry hole, Gulf hit with its second attempt and the discovery well came in for 595 bbl. of 29°-gravity oil per day on ¼-in. choke. The Miocene sand reservoir was perforated at 6,200 ft.

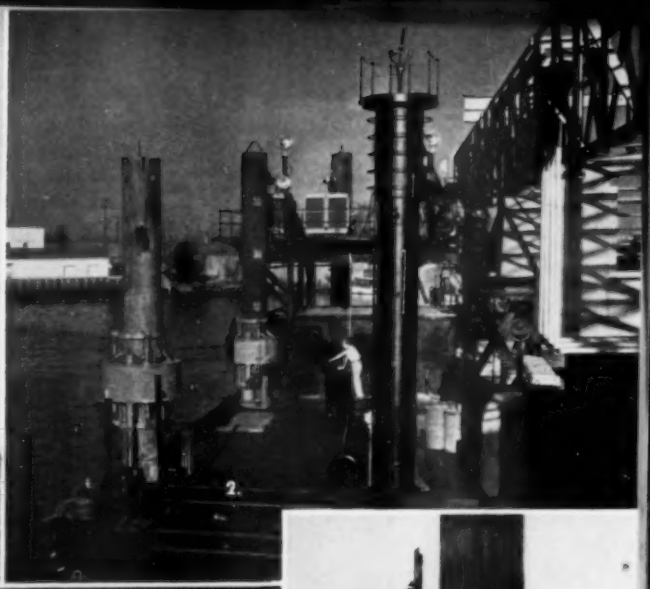
Since the discovery, Gulf, Forest Oil Co., and Sinclair Oil & Gas Co. have drilled a total of 66 wells on this salt dome; 34 made oil, one made gas, and 31 were dusters, for an overall success ratio of 53%. The Miocene producing sands lie between 4,800 and 9,800 ft., and the deepest test so far stopped at 15,072 ft.

For future drilling . . . This field is typical of what we might expect to find in future offshore exploration. It is a huge uplift, very shallow, and structurally very complex. Development so far has centered in Blocks 149, 150, and 154, as shown on the map. Some idea of the great size of the uplift can be had by remembering that each of those blocks contains 5,000 acres. It will take many years of drilling before this field can be described as even half-proved. Today it is producing approximately 5,000 bbl. a day, and the oil is barged to market.

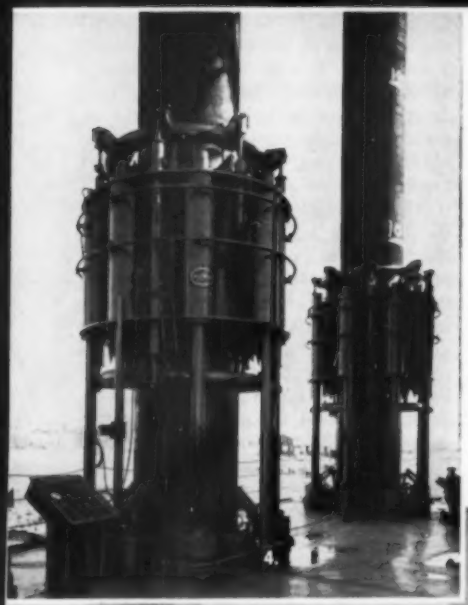
An interesting new development at Block 154 is a flank wildcat now on the way down in the southeast corner of Sinclair's lease in Block 153. Here, the contractor, Barnwell Offshore, Inc., is using its self-contained drilling barge, the "Mister Cap." It's the first time this type of equipment has been used in this field. The target depth is 10,000 ft., and the location is in 66 ft. of water. Sinclair previously has drilled two dry holes in Block 153, but now has high hopes of extending the multipay Miocene productive area westward into this block.

The subsurface geology on the flanks of this huge dome is extremely complicated, and many a dry hole will be drilled before the operators have a complete picture of it. The domal flanks are sliced by both radial and tangential faults, and this makes for many a head-scratching session in the geological departments of the three major operators.

All the offshore structures of course are not as large as Block 154, but it typifies the juicy plums that await the offshore driller. Recessions may come and recessions may go, but the next boom period will certainly bring with it an accelerated drilling campaign in these offshore waters, and operators may begin to cash in on their heavy investments out there.



Big Barge Spud Jacks



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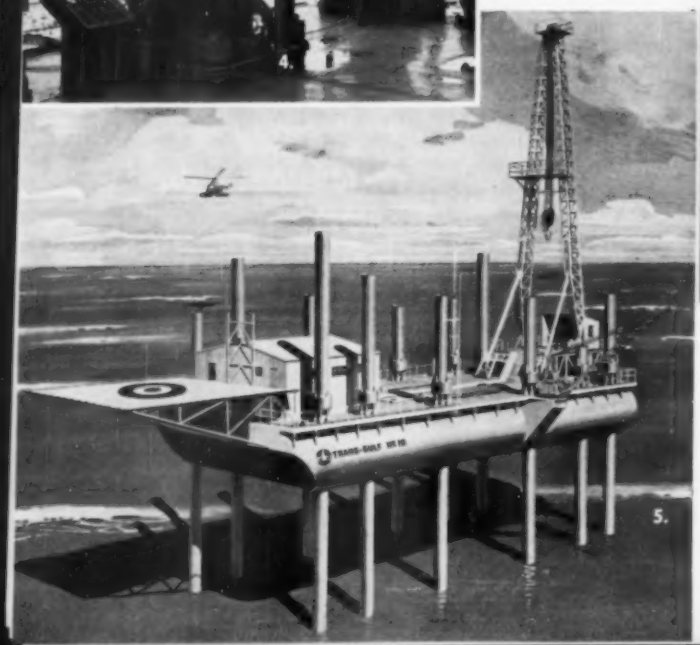

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6. One of Joe Stine's first hydraulic spud jacks.

A second look at your records

by a competent geophysicist may prevent dry holes

Before you take that next deal or stake that next wildcat, why not call in a geophysicist and ask him what he figures it will cost you to do a little shooting? If you aren't familiar with present-day seismic costs, you may be a little shocked, but after you have compared that figure with the cost of a dry hole in the area, it won't seem nearly so bad. The consultant's fee may turn out to be the best money you'll spend all year. The author, Richard Brewer (shown at right in photo, with Guy R. Brainard, left, and Jack E. Hughes, Drilling and Exploration Co.), is a geophysical consultant with the firm of Reed & Brewer, Fort Worth. He has been active in geophysical exploration since 1936, and has had experience both with major oil companies and contracting geophysical firms. He formed the partnership of Reed & Brewer in 1957.

BY RICHARD BREWER
Reed & Brewer, Fort Worth

CHANCES are when you mention geophysics to the average independent he'll tell you, "that stuff is for the big boys. I just don't have the setup to use it," he'll say, "and besides it's cheaper and more conclusive to go on out and drill a well."

Neither of these contentions is quite accurate, at least not in 1958. Tight money, low allowables, and slow payouts have forced the independent to change his thinking. First of all, the well can hardly be considered conclusive unless its structural position is favorable. And in this day of predominantly small and often complex traps, his chances of picking the best location for his well without geological or geophysical help of some sort are not good. Then too, if he scores a "near miss," his budget may not be able to stand a second test and all he has managed to do is set the discovery up for someone else.

Cost of a couple of seismic lines, strategically placed, properly shot, and carefully interpreted, amounts to only a small fraction of the cost of a deep dry hole, even in country where the digging is relatively easy. Where drilling is tougher and costs are higher, the percentage is even more in favor of the geophysical approach. There's no hard and fast rule for resolving this matter of costs, but a lot of operators figure that if the proposed well depth is greater than 6,000 ft. then some seismic work is justified. If the proposed depth is less than 6,000 ft., it becomes a matter of balancing the proposed seismic expense against the cost of looking at the pay.

As for not having the setup to use geophysics, competent geophysical consultants are available to provide expert assistance in exploration problems. These consultants can provide the independent and the small company with the same expert geophysical service that is available to the larger companies through their geophysical departments. Furthermore they are there when you want them. You don't have them on the payroll the year around.

Farmouts . . . Suppose, for instance, you are considering a major company farmout. Not too many years ago most of the geophysical exploration was carried on by the majors, and those companies guarded their information like the Government guards the gold at Fort Knox. There were farmouts then, but seismic work was rarely ever part of the deal.

Since then times have changed and a good percentage of major company farmouts now have seismic work, or gravity information, and sometimes both, to go along with them. The company concerned may not want to show you their maps. If you want to have the records reinterpreted they'll let you.

In the event you want to do that, then your consultant drops by the major's office and picks up the material he will need for his interpretation. While there he can discuss the area and its problems with the company's geophysicists. He speaks their language and he probably will come away with a lot more useful information than you could.

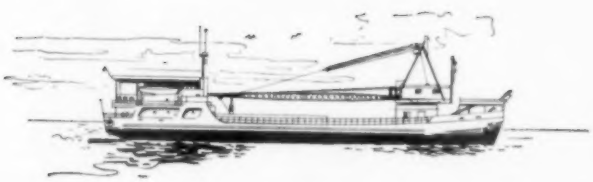
A farmout of this sort has some highly attractive aspects if you stop to consider them. To begin with, the company offering the deal probably spent a good bit of money shooting the area and getting the acreage together. They may even have drilled a dry hole before deciding to farm it out, but in any event you can take full advantage of their work for the cost of interpretation, which won't be much.

In making his interpretation the consultant often enjoys certain advantages over the company geophysicists who did the original work. Having all the records available at one time is helpful in itself. Then, in a lot of cases he may know more now about certain factors like velocity gradients, deeper objectives, regional trends, faulting, and other factors, than was known when the area was first shot. If it becomes necessary to run one or two more lines to check an area of interest, he can take advantage of one or more of the near-revolutionary advances in seismic-exploration techniques.

You may not have kept up with all of them but your consultant has and he will know how to approach the problems that your area presents. When he has finished his interpretations and is ready to present his results, your chances of coming up with a sound, drillable prospect are good. If, on the other hand, it is a high-risk proposition he will tell you so and you can proceed accordingly.

West Texas prospect . . . Let's take a look at the history of a typical farmout and see just what went on. This particular area is in West Texas and the principal objective was the Ellenburger.

Fig. 1 shows four lines which constituted the major company's seismic control for the four sections involved. Lest someone criticize this broad shooting pattern, bear in mind that the major was looking for fair-sized



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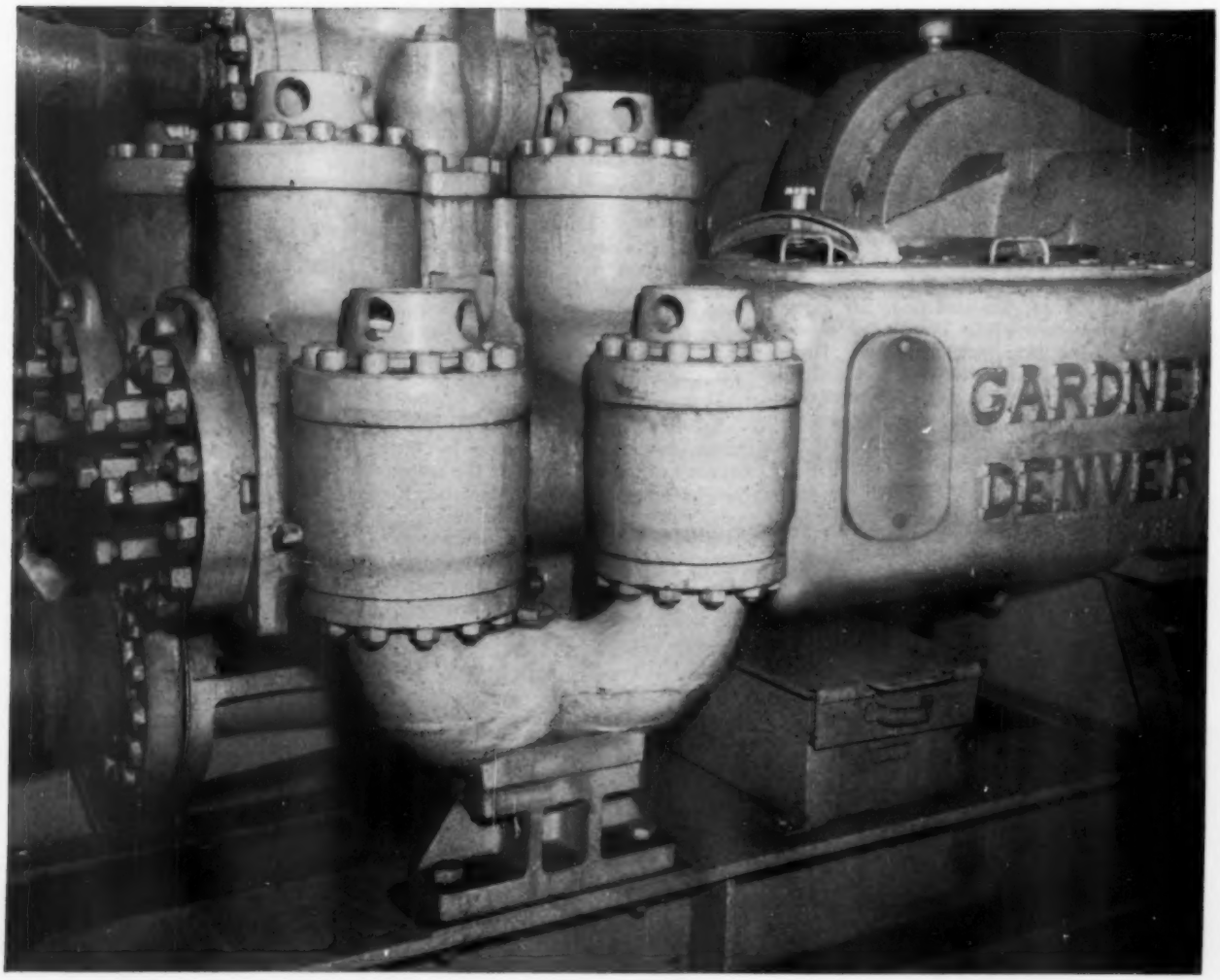
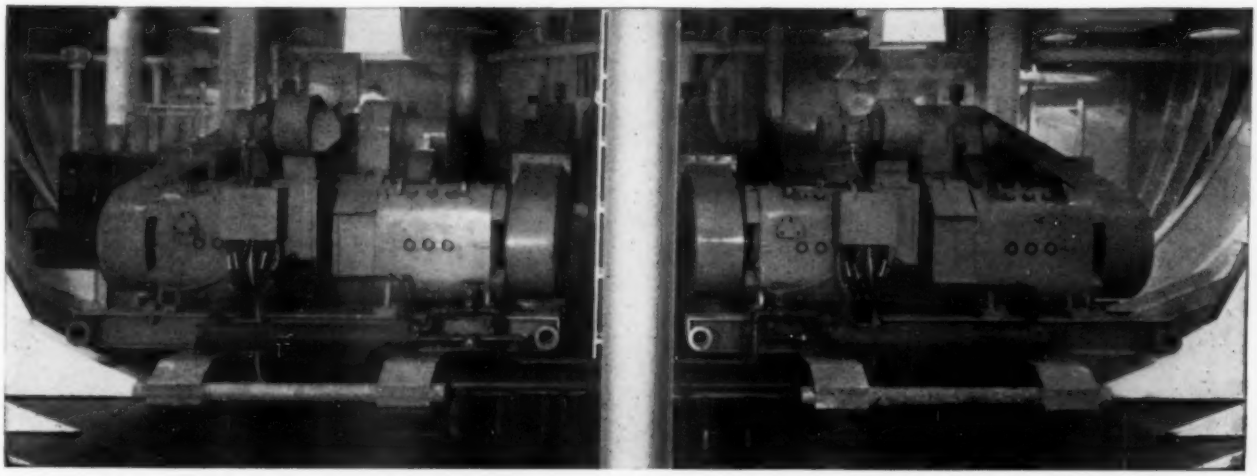


Close-up of divided fluid cylinder end of one of the 1000 hp Gardner-Denver GXR's.



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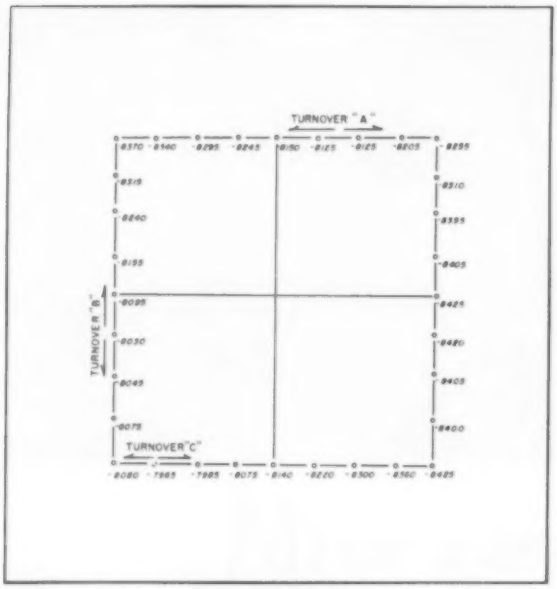
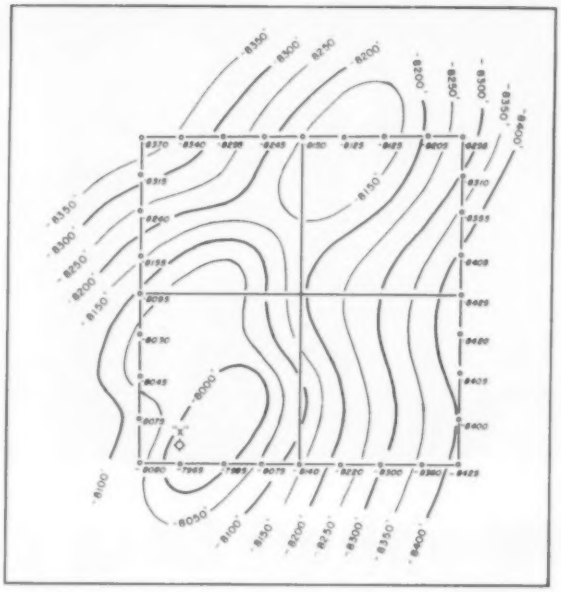
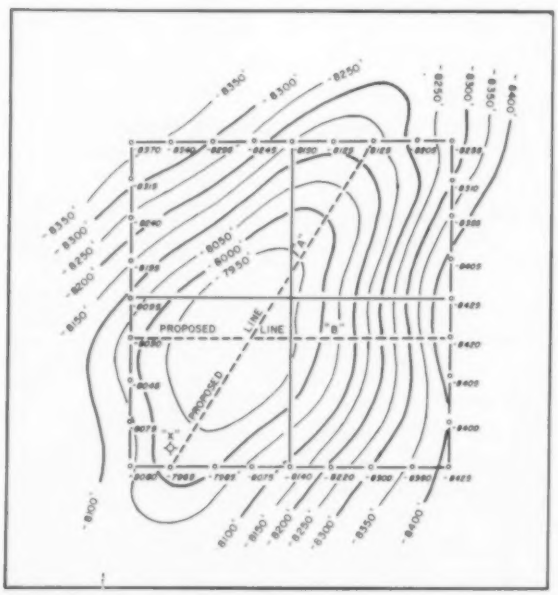


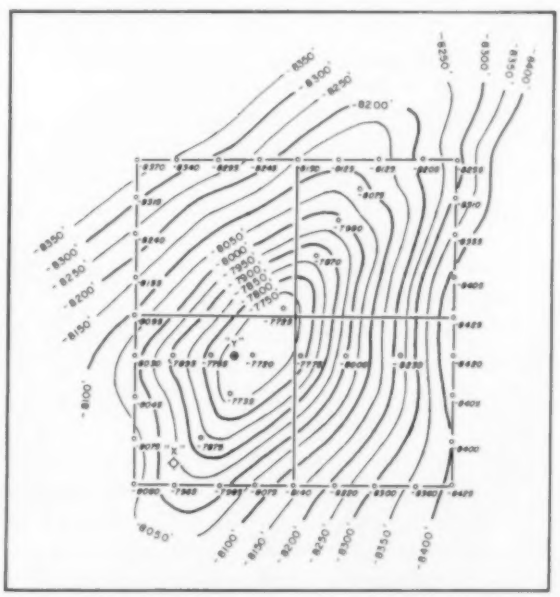
THREE TURNOVERS were picked up by a 2-mile loop during the course of a major oil company's regional seismic program in West Texas. Fig. 1.



A DRY HOLE was drilled by the first independent operator to take the farmout, after the operator based his drilling on this interpretation. Fig. 2.



A SECOND LOOK was taken by a geophysical consultant when the job was farmed out a second time. He submitted this interpretation and suggested more seismic tests. Fig. 3.



A STRIKE was drilled by the second operator when the new seismic work delineated this attractive closure. The discovery helped prove up some 600 productive acres. Fig. 4.

fields, 10 million barrels or more. Closer control would have served no useful purpose so far as they were concerned. Their work showed three turnovers at Ellenburger depth (Fig. 1), but all of them were relatively minor so the acreage was offered for farmout.

A dry hole . . . Independent "A" looked at the deal and decided to take it. He was offered the use of the company's seismic records but declined and asked only to be allowed to use the seismic cross-sections. From those his geologist contoured the Ellenburger as he saw it, and selected a location for a test. Fig. 2 shows his Ellenburger interpretation, and well "X" is the dry hole that resulted.

Review and additional work . . . The farmout was then offered to Independent "B" on the same terms, and he elected to take it despite the deep

dry hole. His first move was to send his geophysical consultant over to the major's office to take a look at the seismic records and discuss the area with the company's geophysicists. At the same time he asked his own geologist to have a look at subsurface in the area.

The consultant reported that the records were fairly good, so he was given the job of reviewing them. As soon as he had finished his work, he and "B's" geologist got together and prepared a combination seismic-subsurface map (Fig. 3), which indicated the possible presence of a sizable high. They then recommended that two supplementary lines, "A" and "B," be shot to confirm or disprove the structure before drilling.

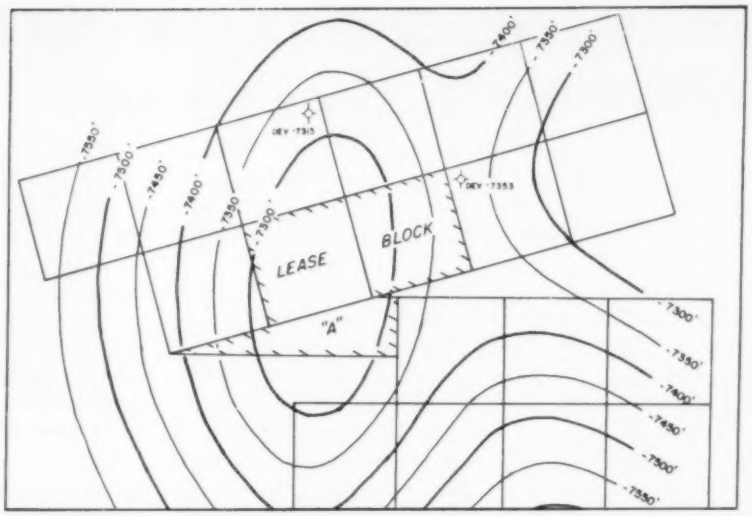
A seismic contractor was hired, the lines were shot, and the results integrated with those from the original work. The final interpretation is shown in Fig. 4; wildcat "Y" drilled on this interpretation, resulted in a good discovery. Since then the field has been drilled up and boasts some 600 productive acres.

Review essential . . . Reworking the records may take quite a while, particularly if there are a lot of them, but there are certain important fundamentals that the consultant can check quickly. He'll want to know when the shooting was done and what type of equipment was used. The type of spread, the number of seismometers per trace, and the arrangement of seismometers are all important, as is also the variation and rate of change of elevation across the prospect.

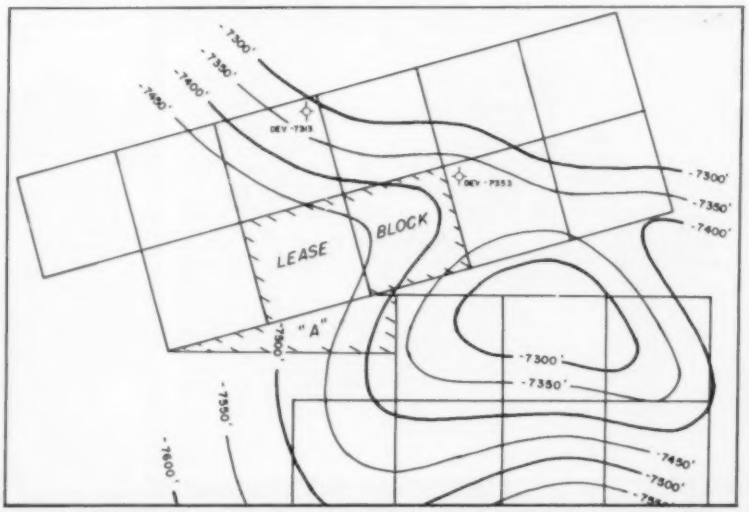
Then he will need to study the reflections themselves to see how good they are and how many of them persist well enough to be mapped. These are just a few of the questions he will want answered, but after an hour or so of checking he should have a pretty good idea whether or not the prospect has merit and a reinterpretation is worthwhile.

Checking seismic work . . . Still another task that the consultant is called upon to perform from time to time is that of passing on a geophysical map of unknown or unverified origin. Few companies or individuals in the business are without a supply of these items which they probably came by quite honestly.

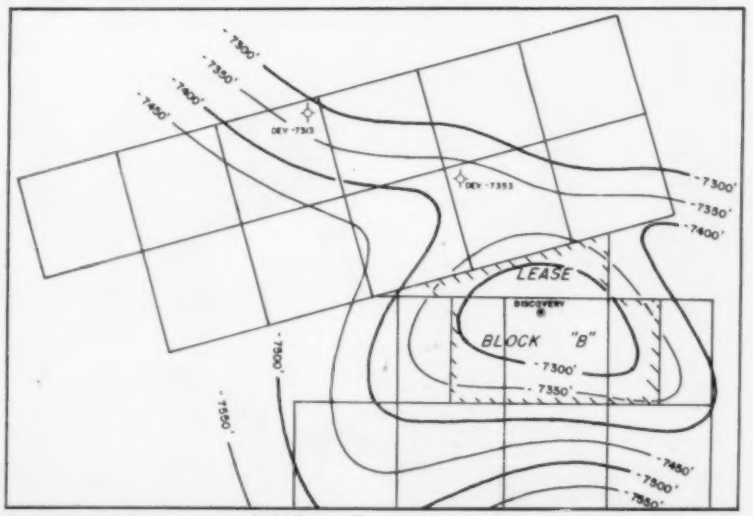
A promoter may have had one made in connection with one of his deals, or perhaps the map in question may simply have been part of an exchange of information between companies or individuals. But very often the map may be an out and out



FIRST LOOK at subsurface control caused operator to lease Block A for a drilling site. Fig. 5.



SECOND LOOK at seismic work showed structure east of Block A on property not leased by operator. Fig. 6.



SUCCESS capped drilling efforts as operator tested Block B and came up with a producing well. Fig. 7.

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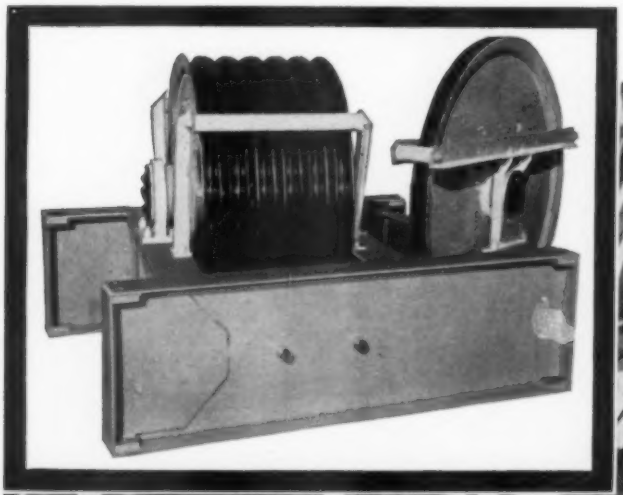

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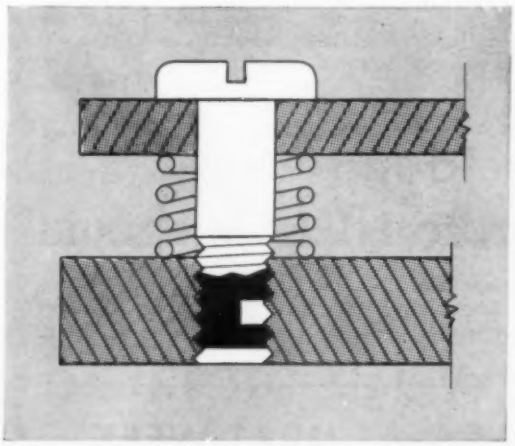

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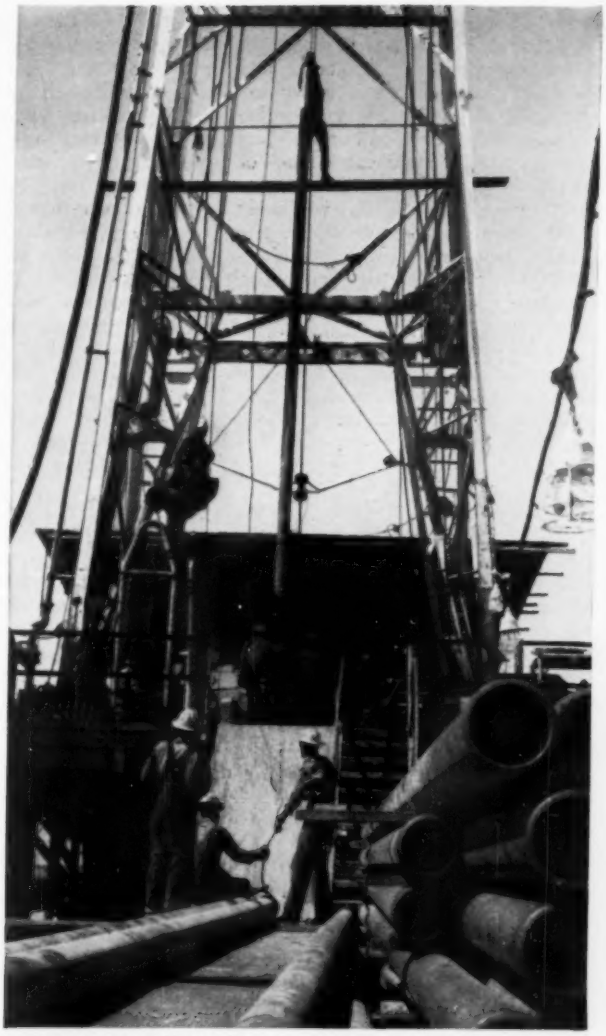

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"phony," so the geophysicists' job is to decide just how good or bad it is.

An experienced consultant, and most of them do have a lot of experience, will almost always spot the more obvious phony in a hurry. Others may be a little more subtle, and of course those will take a little longer, but he's not apt to be fooled by them either. Just as there are few perfect crimes, there aren't many "manufactured" maps without flaws that can be detected by someone who knows what he's looking for.

By the same token, the map with "real class" is also easy to spot, and if you have some of those in your files you may be able to use them to good advantage in your exploration program.

Geological leads . . . Quite a bit of the short-term seismic work being done nowadays is devoted to the investigation of subsurface geologic leads. To check these some independents simply lay out the program they want to shoot, hire a contractor, and turn him loose. This often works out fairly well, for this country is fortunate in having a number of excellent geophysical contractors. But most independents would do much better to call in a geophysical consultant before arranging with a contractor. The consultant can assist in planning the work, and can advise what contractors are most experienced in the particular area.

After the crew has been hired and field work has commenced, the consultant can act as client representative in supervising the crew to see that:

1. Field production doesn't lag.
2. Record quality is kept as high as possible.
3. Unnecessary lines aren't shot.

By the time the job is finished he usually will have saved a lot more than his own cost, and there will be the added assurance that the job has been done right.

Let's look now at a typical example of a geological-geophysical team effort that resulted in the discovery of a new field. The company concerned had no geophysical department, yet they succeeded where several majors had failed. They did so because their project was planned down to the last detail, and because they took advantage of certain technical advances that made accurate deep mapping possible where it hadn't been before.

Geophysical case history . . . Fig. 5 shows a group of deep dry holes from which the company's alert geologist picked up a good subsurface lead. His interpretation is shown, as is also the acreage block the company assembled on the strength of his work. The next move was to call in a geophysicist for a discussion of the prospect.

Together they planned the shooting program, taking into account the fact that terrain might force some of the lines to be moved. Not until the prospect had been thoroughly investigated was a crew sent in to shoot.

Results of the seismic program were excellent, considering the difficult surface conditions encountered, but the structure that was mapped (Fig. 6), fell east of the company's acreage. Fortunately they were able to trade the block they had for another that was favorably located and the story had a happy ending. The new block and the discovery well are shown in Fig. 7.

This story had an interesting twist that is worth relating. After the structure had been mapped and the acreage blocks traded, the company's management decided, in view of the expensive wildcat confronting them, to seek a partner in the venture. A certain major company was approached and, after looking at the maps, they decided that the prospect had real merit.

Their geophysicists were sent down to check the records and, after a favorable report, the smaller company was able to make an attractive deal. All this simply goes to show that scientific oil finding has long since ceased to be limited to the major companies.

Another thing is worth pointing out in connection with this example. Advance planning and careful supervision kept the cost of the program well within the bounds of economics. Thus, even if the original subsurface lead had been washed up, as is often the case, the company's budget still would not have been wrecked.

If you happen to be one of that large and ever-growing group who are gravely concerned about the poor discovery rate in this country, yet who have never availed themselves of the help that geophysics can offer, you'll be smart to give it a try.

Fifth new field in recent months born to NW Oklahoma

A NEW Morrow-Pennsylvanian field discovery in northwestern Oklahoma's Ellis County found more pay in that sand.

Magnolia Petroleum Co. 1 Schoenhals, C NE SW 24-21n-26w, northwest of Shattuck, is treating new intervals at 9,582-9,608 and 9,683-93 ft. Treated perforations at 9,762-75 ft. flowed 13 M.M.c.f. of gas per day. This new field is the fifth new producing area in this county in recent months.

The inside Hugoton field North Hardesty field, Texas County, Oklahoma Panhandle, continues to grow. The newest addition to the Morrow-Pennsylvanian field inside vast Hugoton field Permian production is Panhandle Eastern Pipe Line Co. 1-33 Hopkins, C NW SE 33-3n-18eCM.

The well flowed 14,900 M.c.f. of gas per day from upper Morrow sand perforations at 6,300-36 ft.

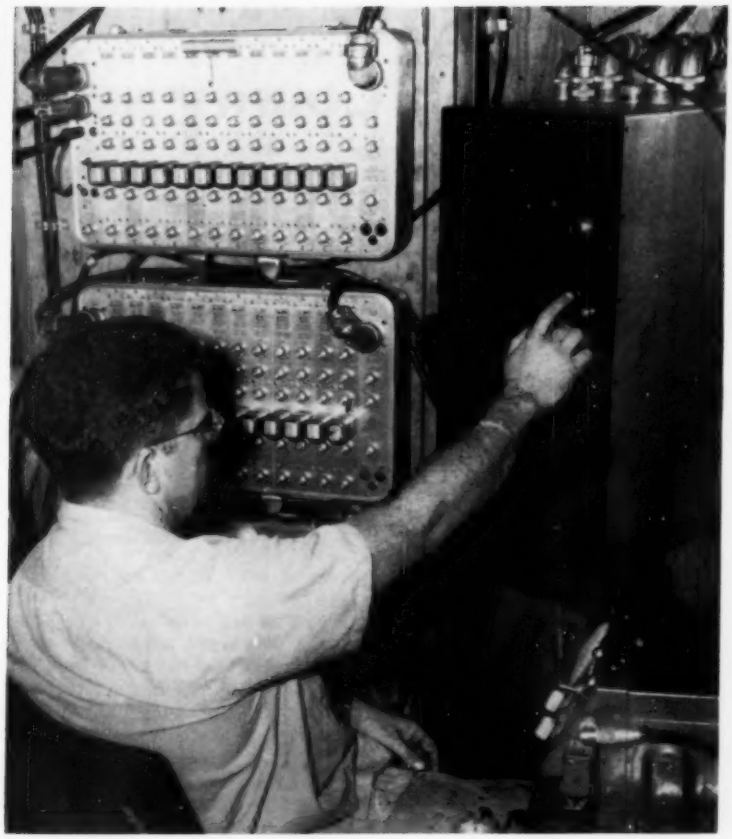
Guymon area . . . Other events in this region include tests at Republic Natural Gas Co.'s 3 Julian, NW NW SE 3-5n-13eCM, inside the Hugoton area. This well is being tested at 5,604-40 ft. Recovery was 60 ft. of gas-cut mud.

In the immediate area the same operator's 9 Cities Service, C SE SW 5-4n-13eCM, was completed flowing 8,500 M.c.f. per day from upper Morrow perforations at 6,077-89 ft.

NEXT WEEK

Are you practicing productive geology?

This explosive charge . . .



is picked up by this recorder as . . .

Seismic crews take to the sea

to prospect tideland waters

CONSERVATIVE ESTIMATES of oil reserves in the United States indicate that 40 to 50 billion barrels lie undetected inland and under tideland waters. Modern seismic exploration methods render invaluable service to the oil industry in making rapid, accurate subsurface geological maps of areas where faults, traps, synclines, anticlines, or domes may exist. New instrumentation, equipment, and techniques provide accurate and informative seismic data at the lowest cost and in the shortest reasonable time.

Offshore prospecting . . . At sea, three boats are used: a recording boat, a shooting boat, and a third for carrying supplies. The cable with geophones attached is towed behind the recording boat at a predetermined speed with pauses of short duration while the charge is laid by the shooting boat, detonated, and recordings made. Courses and positions are maintained by strict radio-navigation control. With close liaison between shooting and recording boats, high shot-rates can be maintained and large areas can be quickly and systematically surveyed.

Extensive land exploration is thought to have discovered most of the large and easily mapped structures, while offshore exploration is in a sufficiently early stage to be concerned only with detecting the large and easily definable areas of interest. Because prospecting offshore is concerned with large structures only, the dry-hole ratio is considerably lower than on land at the present stage of tideland development.

With today's operators more cost conscious than ever before, it is interesting to compare an offshore and a land seismic exploration crew. The performance of a water crew approaches 200 shots a day under ideal conditions compared with approximately 16 a day on land. Offsetting this, over-all cost of equipping a deep-water crew is approximately 16 to 20 times that of outfitting a land crew.

An offshore team requires large, powerful boats equipped with photographic or magnetic recording equipment, or both; an accurate radio-navigation system, and the heavy marine-cable reels for the special geophone cable. Compare this with the relatively simple equipment carried by land crews.

Daily cost of operating a land crew is a fraction of the expense involved in keeping boats and their crews operating at peak efficiency with fuel, food, fresh water, equipment, and spares sufficient for long recording tours without returning to port.

In Texas

Is Grayson County back in running?

LAST WEEK a heavy flow of oil while drill-stem testing in the Oil Creek (Ordovician) sand at a North Texas wildcat brought up some interesting conjectures. Can one good well revive the once-heavy drilling play and hopes of Grayson County?

No. 1 Nora drilled additional sand to 6,185 ft. and made a small oil recovery on test at 6,170-85 ft.

The well . . . John M. Hamilton, of Wichita Falls, 1 Nora B. Wood, located 3 miles east of Whitesboro and about the same distance from Whitesboro Oil Creek field, reported a drill-stem test on which oil flowed an estimated 75-100 bbl. an hour.

Operators had drilled into the sand at 6,147 ft., and at 6,170 ft. stopped to run a test on that interval. Using ½-in. chokes, and 500 ft. of water cushion, gas surfaced in 20 minutes and oil in 38 minutes. The flow was to pits and was not gaged. Flowing pressure ranged from 1,110-1,830 psi., and registered 2,280 psi. when shut in. Following the test some 5,800 ft. of clean oil was reversed out of the drill pipe. Drilling continued below 6,170 ft.

Location is on a 40-acre lease, in the T. W. Randolph Survey, A-1524. Acreage in the area was assembled by The Southern Co., a partnership composed of Clyde W. Railback and David E. Gee.

Just a few years ago Grayson County was in boom status. The deep Oil Creek sand was the main objective, but an equal number of small pools were opened in shallower Strawn pays. To make it more attractive, some wells reported "several hundred feet" of prospective pay zones.

Many of the discoveries proved out large productive structures, but the deeper formations were faulted and drilling costs were rough. The series of discoveries throughout the northern half of Grayson County induced service and supply companies to move district offices and warehouses into the area.

While geologists speculated on whether the pay was a continuation of the Golden Trend area, to the northwest in Oklahoma, production began to fall short of early estimates. Supply houses took a dim view of the whole thing and declared the area was good only for the drilling contractors.

Not all bad news . . . Production statistics from the larger fields are more encouraging. In 1937 Big Mineral Creek field production amounted to 1,830,000 bbl., from 142 wells. Cumulative production to the end of 1957 was 7,927,000 bbl., with an estimated reserve of over 27,000,000 bbl.

Sherman field (and East Sherman) produced 3,256,000 bbl. in 1957, from 325 wells. Cumulative production was 18,615,000 bbl., with 51,385,000 on the reserve sheet. This big field, running nearly 10 miles in length in a northwest-southeast trend, is approximately in the center of the county.

On the Oklahoma Side

While the Oil Creek play chilled south of the Red River, things got hot up north. Ordovician fields in the Ardmore - Marietta basin area of southern Oklahoma provide this area's biggest oil interest at this time.

By CARL HOOT

Sinclair Oil & Gas Co. has had a run of five gas-distillate strikes (out of five trys) in the Oil Creek sand of Ordovician age. These wells have been drilled from Harper and Woodward counties on the extreme northwest end of the "trend" to Garvin, Love and Bryan counties on the southeast portion of the trend.

What these strikes mean to the oil finders interested in salvaging Grayson County is still questionable. Most geological opinion is that Grayson County's Oil Creek fields are in the same basin which has opened pools like Madill and Enville on the Oklahoma side, and Sherman and Big Mineral on the Texas side.

Texas operators hit in Hardin County

TWO new productive zones in the Yegua sand have been opened as Sinclair Oil & Gas Co. and Atlantic Refining Co. have confirmed McGill pool in Hardin County, Texas.

The 1 H. McGill fee was dually completed in the C-2 Yegua and the E-3 Yegua sands. Open flow potential from C-2 perforations at 7,194-7,206 ft. was 6,600 M.c.f. of gas and 203 bbl. of 62.8°-gravity condensate per day.

From perforations in the E-3 zone at 7,561-71 ft., the well flowed 9,600 M.c.f. of gas and 287 bbl. of 52.5°-gravity condensate per day.

The well is the second in the pool opened at the 1 Hampton fee B which was dually completd as a gas-condensate discovery in two other Yegua sands.

. . . and in Webb County

NEW OIL PRODUCTION is assured northeastern Webb County in Southwest Texas. Weaver & Sharp have a discovery at 1 Dan Adami estate in Section 4, 2½ miles southwest of Watkins field in the northeast part of the county.

Initial swab tests got 25-30 bbl. of oil per day from open hole test at 1,130-34 ft. This new field is on the Mirando shoreline. Other wells are being staked for drilling in the new area.

In the nation's oil provinces

There's action in Michigan exploration . . .

The first important basin Dundee oil strike in over 2 years, John Neyer, Ray Miller and Byron Gallagher 1 Cotter NW NW NW 5-15n-5w, Isabella County, was flowing restricted 2 to 3 bbl. of oil per hour from Dundee dolomite pay at 3,823-24 ft. following 380 gal. acid treatment.

Wildcat was drilled on an 800-acre block farmed to developers by W. H. Strickler of Mount Pleasant, and is located 5 miles east of Coldwater oil field and 1 mile south of the smaller Gilmore field. Developers surveyed three offset locations.

Wildcat originally was spudded in January this year and first hole lost at 3,814 ft. or 10 ft. short of final completion depth on second hole 50 ft. east.

Scipio Field Extends Southeast With Strike

MICHIGAN'S Scipio field has been extended southeast by McClure Drilling Co. and Aurora Gasoline Co. 1 Haven.

The well flowed an estimated 1,200 bbl. of oil in 5½ hours from Trenton dolomite pay at 3,786 ft. The well went out of control and flowed into pits when the spudder tools caught in the master gate.

Vance Orr, manager of McClure Drilling, was seriously injured and hospitalized when struck by tools as they were freed from the gate valve.

Success in Ohio oil hunting . . .

A WILDCAT, northeast of Malta and McConnelsville and 4 miles from Clinton production, may prove to be a pool opener.

The test on 1 H. C. Bone, Section 29, Bristol Township, Morgan County, made only a small showing of gas natural in Clinton sand at 4,623-54 ft., but gaged 1,450 M.c.f. with an undetermined amount of oil 7 days after fracture.

The operator, V. Watson et al, has a large acreage leased and will start another test soon.

Newton Well Hits

IN OHIO National Gas Co. reported that 1 M. M. Bell, Section 34, Newton Township, Muskingum County, gaged 5 M.M.c.f. 7 days after fracture with a rock pressure of 1,175 lb.

The gasser, nearly ½ mile west of production in Ironpost pool, gaged 600 M.c.f. natural from Clinton sand at 3,475-3,516 ft.

Further drilling to the west is now planned.

And good news from drill sites

In Kentucky . . .

ON ROCKHOUSE BRANCH of Shelby Creek in Pike County, Kentucky West Virginia Gas Co. has completed 1080 James Cable as a Mississippian Big lime gas well.

Big lime topped at 2,730 ft. and bottomed at 3,031 ft., yielded gas at the rate of 500 M.c.f. daily natural.

Total depth of hole is 3,040 ft.

In Many Sections Of North Dakota . . .

NORTH DAKOTA exploratory success returned to the news scene last week with discoveries indicated for both the Nesson anticline area and on the northeast rim of the Williston basin in Bottineau County.

Devonian oil . . . The Texas Co. found oil on drill-stem test of the Devonian at a deep test 3 miles northwest of Fancy Buttes field and 3 miles southeast of Dimmick field off the west flank of the Nesson anticline in McKenzie County.

The 1 Koeser, C NW NW 35-151n-97w, recovered 1,000 ft. of gas-cut oil, water and mud (25% oil) from 11,663-11,740 ft. Pipe recovery also had 1,331 ft. of gas-cut mud. A drill-stem test at 11,460-11,613 ft. had some oil shows. Coring is now under way at 12,020 ft.

Calvert Drilling Co. has an indicated Madison discovery at 1 Signalness, C SW NW 2-150n-96w, 2 miles west of Blue Buttes field, McKenzie County. Perforations are at 9,445-90 ft. at this well. Tests continue.

Bottineau . . . Hunt Oil Co. 1 Nermyr is an indicated Midale-Mississippian discovery for Bottineau County on the northeast side of the Williston basin.

This well, located in C NW NE 31-162n-79w, had a recovery of 655 ft. of gas-cut muddy oil and 30 ft. of heavily oil and gas-cut mud on drill-stem test at 3,384-3,412 ft. This new strike is 2 miles northwest of Newburg field.

In South Louisiana's West Gueydan Field . . .

SOUTH LOUISIANA'S Vermilion Parish added a new gas-condensate area. Sid Richardson Carbon Co. 1 Leo P. Bonin, 3 miles northeast of West Gueydan field, flowed 102 bbl. of distillate and 3,400 M.c.f. of gas per day from deep perforations at 15,025-66 ft. This new discovery is in 14-11s-2w.

Other South Louisiana events include a new gas discovery in Beauregard Parish. The discovery well is Penton & Penton 1 Lutcher-Moore, 1 mile south of Bearhead Creek. The well flowed 112 bbl. of distillate and 1,100 M.c.f. of gas per day on 10/64-in. choke from perforations at 8,508-18 ft. Location is 19-6s-11w.

And in Mississippi's Pearl River County

MISSISSIPPI'S Pearl River County has a new lower Tuscaloosa (Lower Cretaceous) gas-condensate discovery. Jett Drilling Co., Inc. and Crosby Mineral Co. 1 Southern Mineral Co., SE SE 27-1s-17w, flowed at the daily rate of 3,170 M.c.f. and 54 bbl. condensate, opening Stewart field.

Production in this field-opener is from perforations at 9,010-18 ft.

Elsewhere in Mississippi Gulf Oil Corp. is preparing to perforate for production tests at its indicated discovery at 1 Gwinville Unit, 34-9n-19w, Gwinville field, Jefferson Davis County. The operator reported three gas sands; one sand at 13,196-13,220 ft. in the Rodessa, 13,982-14,002 ft. in the Sligo, and 14,382-14,430 ft. in the Hosston.

Gulf will test the Hosston first. Other gas zones were logged further up the hole. There are 289 ft. of indicated pay sands.

Oklahoma's Fort Cobb anticline may yield to deep drillers

OPERATORS are jubilant over the results to date at Howell & Howell's 1 Anadarko Basin, southwestern Oklahoma.

The well is running some 1,400 ft. high to the nearest deep test on the structure, the Superior Oil Co. 1 L. Weller and has logged 160 ft. of Morrow sand, apparently all gas bearing according to preliminary electric-log interpretation.

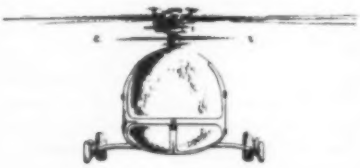
The zone (15,155-15,335 ft.) has threatened to blow out and as a result, Howell & Howell will not test it until casing has been set.

The well has topped the Springer shale at 15,580 ft. and logged Springer sand at 15,725 ft. If no faults are encountered, the well could top the basal Oil Creek sand or the Arbuckle above 21,000 ft., considerably higher than originally anticipated. The well is currently drilling ahead below 16,000 ft.

The 1 Anadarko Basin is attracting the attention of every southern Oklahoma drilling contractor, petroleum engineer, and oil finder. The well is located on one of the largest seismic structures mapped in the Anadarko basin, the Fort Cobb anticline; it is at least 12 miles long and 3 miles wide. The Superior 1 Weller was the deepest well drilled on the structure and reached a total depth of 17,800 ft. before it was finally abandoned in Springer beds.

Now it appears that another "barren structure" will produce and open a broad new horizon for deep drilling in the Anadarko basin.

Ordovician production, still a distinct possibility at the 1 Anadarko Basin, would inaugurate a long-range drilling program that will require at least 5 years to develop the potential of this sprawling seismic structure.



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Harper County Hits

EAST STOCKHOLM field in northwestern Oklahoma's Harper County has a new pay, the Morrow sand—Pennsylvanian.

Shell Oil Co. and Eason Oil Co. 1-7 F. W. Madsen, SW SW NE 7-26n-23w, flowed 22,800 M.c.f. of gas daily and 5.5 bbl. of condensate per million from perforations at 6,715-32 ft.

Kansas well on pump

NORTHWEST KANSAS' important Pennsylvanian discovery in Sherman County is on pump, making about 250 bbl. of oil daily from 8 ft. of Cherokee sand at 4,804-12 ft. This well, Phillips Petroleum Co. 1 Llanos, W½ NW NE 10-6s-37w, is being boomed as one of the most important strikes in the region in many years.

The Cherokee is only one of several Pennsylvanian zones thought to be productive at this Las Animas arch country wildcat. Location is 20 miles northeast of Goodland.

Phillips is already drilling at another stratigraphic wildcat 6½ miles east of the city. It is the 6 Goodland Prospect. The company plans several of these tight holes in this region.

Illinois scores find

GALLATIN COUNTY in Illinois scored one of its best Aux Vases lime-Mississippian discoveries in some time.

It is V.S.&S. Drilling Co. 1 Nemaha-Pritchett, NW NE SE 4-8s-8e, 2 miles southwest of Omaha. The well is flowing 497 bbl. of oil per day on 12/16-in. choke from perforations at 2,667-75 ft.

Other Illinois basin news items include a new discovery in Jasper County at J. W. Rudy 1 Menke, SE SE NW 6-5n-11e, 2 miles south of St. Marie. This well pumped 365 bbl. of oil per day, natural, from the McClosky-Mississippian lime at 2,846-54 ft.

In the Indiana part of the basin Development Associates Inc. completed the 1 Weber discovery well in 3s-9w, Gibson County.

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Successful Wildcats

ALBERTA

Home-Regent 10-10-67-10 Swan Hills, LSD 10, 10-67-10w5. Beaverhill Lake oil discovery. TD 8,594 ft.

ARKANSAS

Johnson County: Arkansas-Western Gas Co. 1 J. B. Hurst, NW NE SW 4-9n-25w. IP 7,000 M.c.f. of gas per day. Lower Bynum sand 3,141-64 ft. TD 4,855 ft. Gas discovery.

BRITISH COLUMBIA

White & Lloyd-Fargo 17 Blueberry, Unit 36, Zone C 94-A-13. Triassic gas well. TD 7,152 ft.

21 Blueberry, Unit 50 Zone K 94 A-12. Triassic gas well. TD 4,400 ft.

CALIFORNIA

San Mateo County: Transierra Exploration Corp. 2 Muller, SE SE 17-7s-4w, 40 BOPD, 32° gravity, clean, perfs. 2,298-2,304 ft. TD 2,334 ft. (Extension test ½ mile southwest of La Honda field production).

Los Angeles County: Edward Lustgarten, 1 Lucky Lusty, NW SE 14-4n-16w, 50 BOPD, 40° gravity, 10% cut, perfs. 2,344-2,415 ft., TD 2,993 ft. (One mile northeast of the town of Saugus in the Bouquet Canyon region.)

COLORADO

Morgan County: Skelly Oil Co. 2 Tomky, C NE NW 21-2n-55w. IP 153 BOPD, 41.1°. "J" sand 4,920-26 ft. TD 5,042 ft.

Washington County: W. C. McBride and H. L. M. Drilling Co. 1-B Horn, C NE SW 34-1n-54w. IP 150 BOPD, "J" sand 4,889-93 ft. TD 4,953 ft.

Weld County: O'Dell Oil Co. 1 Nelson, C NE NE 12-10n-59w. IP 55 BOPD, "J" sand 6,912-17 ft. TD 6,979 ft.

ILLINOIS

Jasper County: Virgil I. Helgen 1 Nora Hester, SW SW NW 28-8n-9e. IP 75 BOPD, McClosky 2,762-70 ft. TD 2,823 ft. Extension to Gila pool.

Wayne County: Commonwealth Petroleum Corp. 1 Holland-Clem Consolidated, NE SE NE 20-1n-7e. IP 52 BOPD, McClosky 3,199-3,205 ft. TD 3,205 ft. Extension to Clay City Consolidated.

INDIANA

Cass County: Owen-Huff 2 K. & M. Lucas, NE NE 22-28n-1w. IP 2 BOPD, Trenton 935-939 ft. TD 939 ft.

KANSAS

Edwards County: D. R. Lauck 1 Kearns, NE NE SE 23-25s-16w. IP 73 BOPD, 34.6°. Kinderhook 4,349-55 ft. TD 4,485 ft. New discovery.

Graham County: Imperial Oil of Kansas 1 Law "B," NW NW SE 24-8s-23w. IP 132 BOPD, 34.5°. Lansing 3,601-04 ft. TD 3,660 ft. Opens Hill City pool.

Herndon Drilling Co. 1 Rome, SE SE NW 34-9s-25w. IP 44 BOPD, 43°. Lansing 4,016-25 ft. TD 4,100 ft. Opens Emor pool.

Empire and NCRA 1 Krug, NE SW SE 18-10s-25w. IP 397 BOPD, 34°. Lansing 3,999-4,005 ft. TD 4,050 ft. Opens Gurk pool.

Meade County: Skelly Oil Co. 1 B. H. Cordes, NW NW NW 36-33s-29w. IP 72 BOPD, 42 BWPD, Morrow 5,690-98 ft., 5,704-09 ft. TD 5,860 ft. New field.

Pawnee County: D. F. O'Rourk 1 A. C. Wick, SW SE SW 21-22s-15w. IP 17 BOPD, 93 per cent b.s. & w. 30.8°. Arbuckle 3,971-73 ft. TD 3,980 ft. Opens West Dunes pool.

Stafford County: Petroleum, Inc., 1 Goodman "B," SE SE NE 1-25s-14w. IP 252 BOPD, 3 per cent b.s. & w. Miss. 4,042-50 ft. TD 4,337 ft. New pay in Albano pool.

KENTUCKY

Daviess County: J. C. Miller and Ashland Oil & Refining Co. 2 Austin Heirs, 12-N-27. IP 40 BOPD, Paint Creek sand 1,842-57 ft. TD 1,882 ft. New pay discovery.

NORTH LOUISIANA

Bossier Parish: Union Producing Co. 1 R. H. Ward Unit, C SW NE SW 3-16n-11w. IP 1,375 M.c.f. of gas per day, Pettet 5,273-78 ft. TD 6,012 ft. Discovery of new pay in Elm Grove pool.

MISSOURI

Vernon County: Walter Vette et al 1 Russell Brooks, NW¼, 35-38n-33w. IP 300-350 M.c.f. of gas per day. Bartlesville sand 285-301, 347-54 ft. TD 382½ ft.

NEBRASKA

Banner County: Davis Oil Co. 1 Olsen, C SE SW 15-19n-55w. IP 80 BOPD, "D" sand 5,449½-5,452 ft. TD 5,632 ft. Opens Davis field.

Kimball County: Shell Oil Co. 1-881 State, C SE NE 12-12n-58w. IP 492 BOPD, "D" sand 7,002-12 ft. TD 7,196 ft. Opens Durham field.

British-American Oil Producing Co. 1 Allchin, C SE SE 10-12n-56w. IPF 712 BOPD, "J" sand 6,537-48 ft. TD 6,652 ft. Opens Allchin pool.

SOUTHEAST NEW MEXICO

Lea County: Sinclair Oil & Gas Co. 1-403

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State, 22-18s-35e, 14 mi. SW Lovington. IP 478 BOPD, 24/64-in., 34° gravity, GOR 967, TP 100 psi., Bone Spring 8,504-14 ft., TD 15,000 ft., PB 10,278 ft., elev. 3,899 ft. Tops: Woodford 11,598 ft., Devonian 11,834 ft., Montoya 14,262 ft., Simpson 14,568 ft., McKee 14,772 ft.

NORTH DAKOTA

Bottineau County: Cardinal Drilling Co. 1 Stratton, C SW SE 24-161n-82w. IP 67 BOPD, 163 BWPD, 27.6°. Mission Canyon 4,112-28 ft. TD 4,340 ft. Opens South Wayne Basin field.

Divide County: Kerr-McGee Oil Industries, Inc., et al 1 Arlot Johnson Estate, C NE NW 34-162n-101w. IP 152 BOPD, 102 BWPD. 36.7°. Red River-Ordovician 11,256-80 ft.; 11,312-26 ft.; 11,371-90 ft. TD 11,782 ft. South Fortuna area discovery. Opens Riding Rock field.

OKLAHOMA

Alfalfa County: B. M. Heath and J. C. Dudley and Gulf 1 Taylor, C NW SE 2-26n-12w. IP 21,500 M.c.f. of gas per day, 60.90. Cherokee 5,468-96 ft. TD 5,619 ft.

Gulf Oil Corp. et al 1 State, 16-28n-10w. IP 5,400 M.c.f. of gas per day, Cherokee 4,914-26 ft. TD 5,026 ft.

Beaver County: The Texas Co. and Sun Oil Co. 1 Helen Barby "C," C NW NW 10-1n-22eCM. IPF 520 BOPD, 40.1°. Lansing-Kansas City 6,032-46 ft. TD 8,148 ft. New field.

Republic Natural Gas Co. 1 K. Nine, C SW NE 21-3n-27eCM. IP 7,335 M.c.f. of gas per day, 58 BOPD, 134 BWPD. Hoover 4,592-4,612 ft.; Tonkawa 5,619-28 ft. TD 7,783 ft. New field.

Carter County: C&S Oil Co. 1 Fish, C NW SW SE 10-1s-2w. IP 25 BOPD, 29°. Bromide 800-818 ft. TD 850 ft.

Cimarron County: The Texas Co. 1 R. S. Pawkins Unit, C SW NE 26-1n-9eCM. IP 23,479 M.c.f. of gas per day. Oswego (new pay) 4,284-90 ft.; Cherokee 4,302-10 ft.; Morrow 4,592-4,604 ft. TD 5,160 ft. New pay in Southeast Griggs field.

Noble County: B. T. Murphree 1 Diem, SE NE SE 6-21n-2w. IP 3 BOPD, Campbell 1,946-52 ft. TD 5,538 ft.

OHIO

Morgan County: Virgil Watson et al 1 H. C. Bone, Sec. 29, Bristol Twp. Clinton 4,623-54 ft. 1,450 M.c.f. TD 4,690 ft.

TEXAS PANHANDLE

Hemphill County: El Paso 1 Feldman, 10 miles northwest of Canadian, Sec. 135, Blk. 42, H&TC Sur. IP 6,800 M.c.f. of gas per day, Morrow sand 10,096-10,114 ft. TD 11,660 ft. Gas discovery.

Ochiltree County: Horizon Oil & Gas Co. 1-836 Delbert Davis, 2 miles northwest of Dude-Wilson field in Sec. 836, Blk. 43, H&TC Sur. IP 36,500 M.c.f. of gas per day and 2 BD per million, 8,636-53 ft. Morrow. TD 8,850 ft. Gas discovery.

SOUTH TEXAS

Webb County: Ginther, Warren & Ginther-Gulf-Halbouty et al 1-B O. W. Killam, 14 miles northeast of Laredo, Sec. 1807, GC&SF Sur. IP 9 M.M.c.f. of gas per day, 55.1°. GLR 28,300:1. Lower Wilcox 5,994-6,032 ft. TD 8,677 ft. Gas-distillate discovery. First production on Pescadito salt dome.

WEST TEXAS

Borden County: Shell Oil Co. 1 O. B. Dalton, Sec. 22, Blk. 30, T6N, T&P Sur., 8 mi. N Gail. IP 195 BOPD, 17/64-in., 38°-gravity, GOR 896, TP 525 psi., Pennsylvanian 8,358-66 ft. TD 8,741 ft.

Crane County: Gulf Oil Corp. 580 W. N. Waddell, 7-B21-PSL Sur., 12 mi. SE Monahans. IP 152 BOPD, 20/64-in., 35°-gravity, GOR 619, TP 100 psi., McKee 6,185-90 ft. TD 6,260 ft., elev. 2,649 ft.

R. W. Windfohr 5 McKnight "A," 10-B21-PSL Sur., 23 mil. SE Monahans. IP 335 BOPD, 16/64-in., 36°-gravity, GOR 618, TP 600 psi., Tubb 4,450-4,550 ft. TD 6,065 ft. New pay discovery in H. Sand Hills-Ellenburger field.

Garza County: Shell Oil Co. 1-D Slaughter, 18-1-J. Hays Sur., 11 mi. S Post. IP 225 BOPD, 10/64-in., 37°-gravity, GOR 561, TP 925 psi., Pennsylvanian 7,968-74, 7,992-99, 8,050-60 ft. TD 8,810 ft., elev. 2,548 ft.

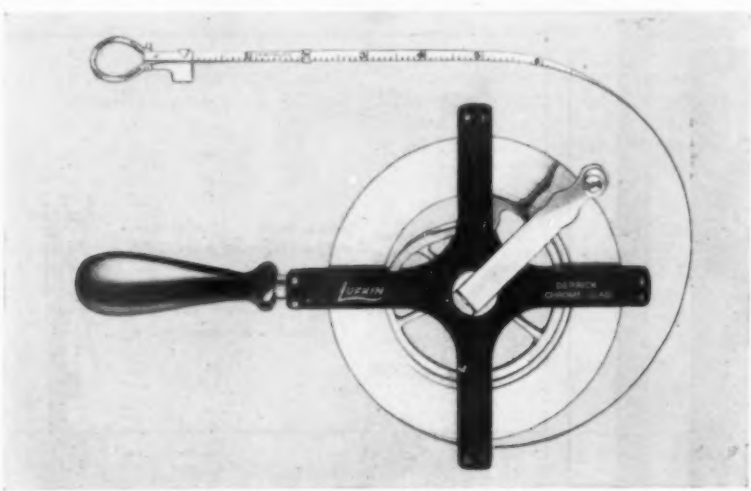
Lubbock County: Amerada Petroleum Corp. 1 Roy Johnson, 40-AK-GC&SF Sur., 5 mi. W Lubbock. IPP 98 BOPD, 30°-gravity, GOR 104, Leonard 7,470-93 ft. TD 10,555 ft. Lowest marker Strawn at 10,125 ft., elev. 3,310 ft.

Motley County: Pan American Petroleum Corp. 1-B Brandon, Sec. 3, Blk. O-2, A. M. Bourland Sur., 4 mi. E Roaring Springs. IPP 103 BOPD, 37°-gravity, Permo-Pennsylvanian 4,196-4,217 ft. TD 6,215 ft., elev. 2,519 ft.

Terry County: Joseph I. O'Neill, Jr., and Hancock Oil Co. 1 Mason, 16-X-PSL Sur., 6 mi. SE Sundown. IPP 137 BOPD, 27°-gravity, GOR 240, Glorieta 5,896-5,940 ft. TD 7,237 ft., elev. 3,463 ft.

WYOMING

Washakie County: Pan American Petroleum Corp. 43 Unit, C NW NE 32-48n-91w. IP 634 BOPD, Phosphoria 8,896-8,935 ft. TD 8,992 ft. Extension to Cottonwood Creek field.



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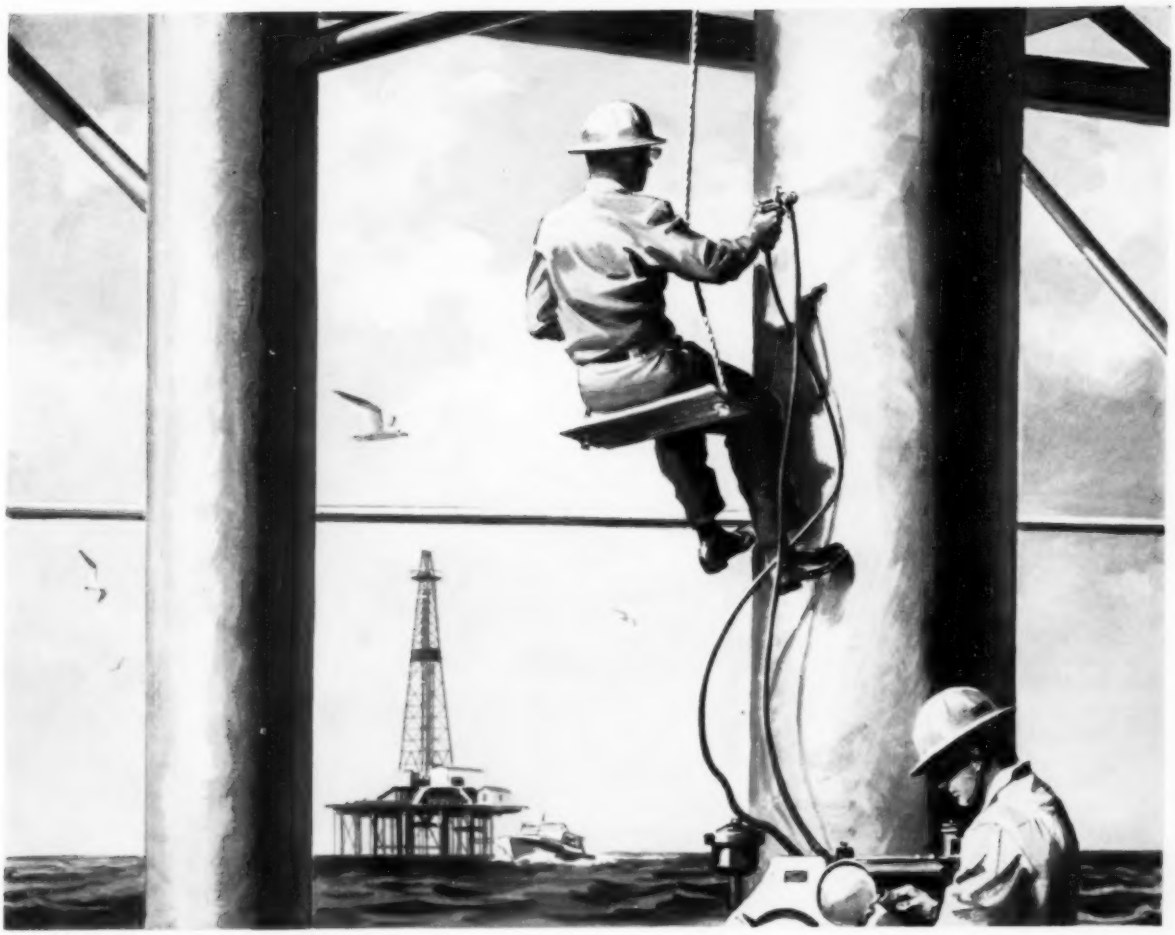

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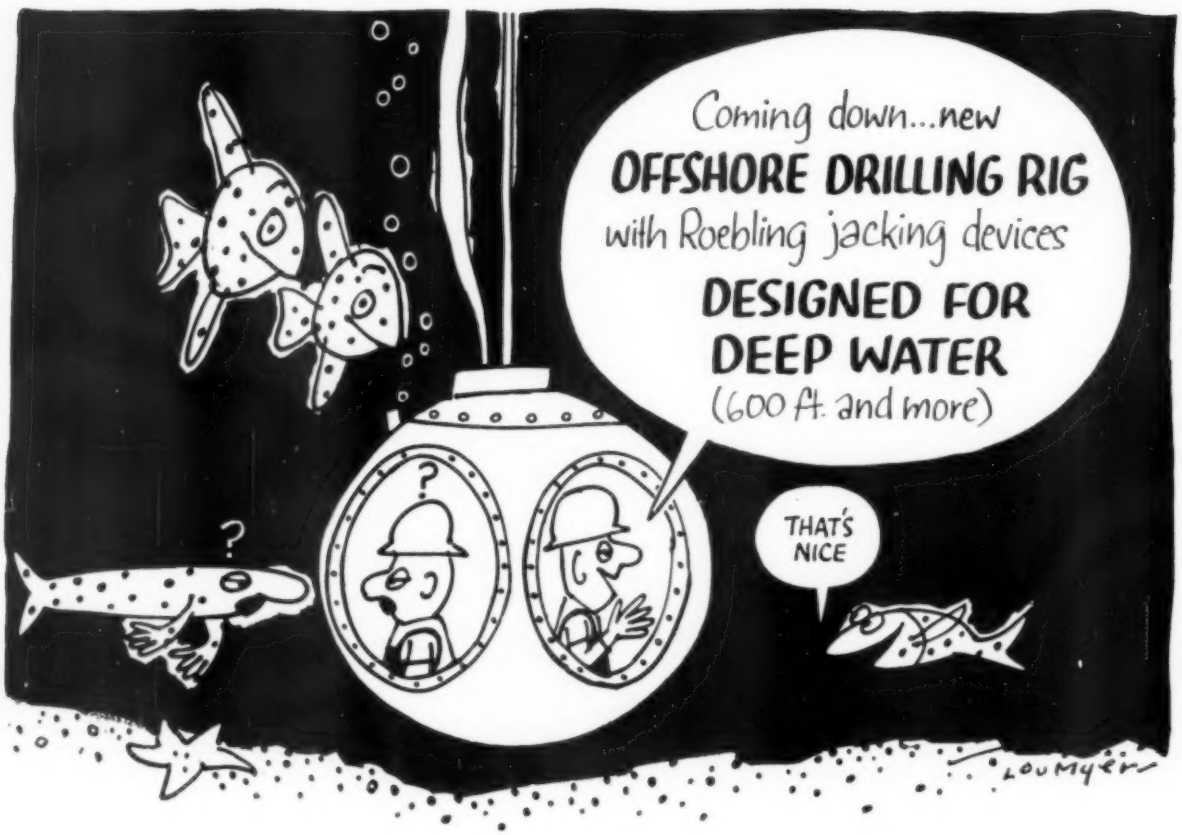

Expressly designed for deepwater locations, this equipment enables drilling where present types cannot operate.

The rig (Figure A) is towed to the drilling site in a buoyant condition, with both the anchor and deck float dewatered. At the drilling site, the anchor is gradually filled with water and lowered to the bottom by the jacking equipment. Once at the ocean floor, the anchor is completely filled with water, firmly seating it on the bottom.

While this operation is in progress, the buoyant float (Figure A) remains on the surface. Once the anchor is seated on the bottom, the Roebling jacking equipment goes into operation to bring the deck float down to operating position, which is at a predetermined level below the area wave action (Figure B).

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FIG. A

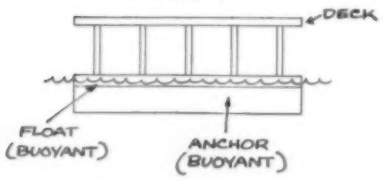
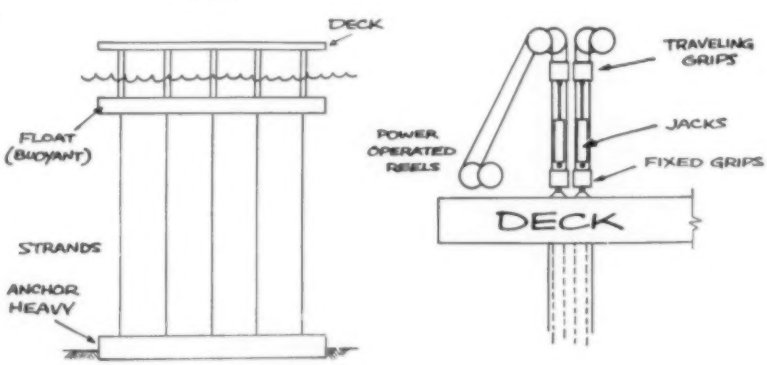


FIG. B



Career Hits Half-Century Mark

WITH A half century of petroleum geology behind him, 74-year-old Everett Carpenter leaned back in his chair in his Oklahoma City office, recalled the colorful past and contemplated on the future.

The husky, grey-haired oil veteran, who has been termed the "patriarch of petroleum geologists," grinned when he said he "expects" the second 50 years to be rougher than the first. But it couldn't be any more exciting.

Some of his career highlights make an impressive list:

. . . His surface survey in the Augusta, Kans., area in 1913 led to the first oil deal made purely on geologic evidence in the Mid-Continent area, and possibly in the nation.

. . . He directed the first wide-area geological survey ever made, resulting in the El Dorado, Kans., discovery in 1915.

. . . He was one of the first geologists hired on a full-time basis by an oil company (in 1913), and organized the geology department of what is now Cities Service Oil Co.

. . . Carpenter joined with other pre-World War I geologists in founding the American Association of Petroleum Geologists.

Now vice president and chief geologist for Porter Oil & Gas Co., Carpenter can number these and others among his achievements during a half century in the oil patch—in a career he chose by chance.

Carpenter was born May 24, 1884, in Holton, Kans., the son of a farmer. He and his family moved to Lexington in Oklahoma Territory in 1898. During his freshman year at the University of Oklahoma shortly after statehood in 1907, he decided to become a geologist.

By chance, Carpenter took a course in geology and "liked it so well I stayed with it"—a decision he has never regretted.

Carpenter drew his first pay in geology during the summer months of 1908 with the Oklahoma Geological Survey in Osage, Washington, and Nowata counties for the handsome salary of $20 a month. "They did furnish us meals in camp," he said.

The following summer Carpenter went with the U.S. Geological Survey, working in Washington, and later doing field work back in Osage County in Oklahoma. After obtaining his degree in geology from OU in 1911 (along with about eight or nine other geologists), Carpenter returned to the USGS for 2 more years, working in Washington, D. C., Utah, and Nevada.

Everett Carpenter . . .
. . . "patriarch of geologists."

First highlight . . . In 1913, Carpenter became one of the first geologists to be hired full-time by an oil company.

He was hired by the Quapaw Gas Co., which later became Empire Gas & Fuel Co., and then Cities Service Oil Co.

Because his new firm had the word "company" following its name, Carpenter figured it was "rolling in wealth." He soon found out he was wrong on that point. His office in Bartlesville was located above a grocery store and was equipped only with a table and a chair.

"I had none of the tools so necessary to a geologist, such as a compass, aneroid barometer, or a hand level—but I soon 'maneuvered' for them," he said.

First big success . . . Search for a gas supply resulted in one of Carpenter's major accomplishments.

Combining theory taught at OU with the fact some small gas showings had been found in some wildcat wells near Augusta, Kans., Carpenter started a surface survey there in August 1913. He mapped the Fort Riley and Winfield limestones by pacing the distances from numerous points on the outcrops to section lines and corners.

Carpenter prepared a map, showing the outcrops in color, and indicating the inclination or dip of the rocks with the dip and strike symbols then in use. It was a noble map, as Carpenter recalls, except for one thing—the general manager couldn't understand it.

Absolute elevations were needed for a cross section, and Carpenter convinced the manager that a detailed survey with a telescopic alidade was necessary. But he wasn't permitted to buy the instrument.

The young geologist showed initiative and nerve to overcome the problem. He waited until all the company officials were out of town for a couple of weeks and placed an order for an alidade. He got the alidade—plus a "severe lecture" later by the officials.

Carpenter then hired J. Russell Crabtree, an OU graduate in civil engineering, and another map was made with the structure portrayed by means of contours which the company officials could easily understand.

On the basis of the map—and Carpenter's confidence—the company made a deal to drill. He said it was the first deal that he knew of that was made purely on geologic evidence.

Carpenter's confidence was well founded. The company found gas at about 1,400 ft. and then discovered oil at 2,466 to 2,516 ft.

With the success, the stature of the geologists zoomed upwards. Referred to disdainfully before as "oil sniffers" or "oil smellers," the geologists became known as the "men with the eagle eyes."

The following year, 1915, Carpenter directed the detailed survey (termed by the Kansas Geological Survey as the first wide-area geological survey ever made) which led to the El Dorado discovery.

During that time, Carpenter was building up his company's geological staff. He said a lot of the geology students graduating in those days "didn't know limestone from sandstone," but he hired them, "developed a school of our own at Bartlesville and gave them the rudiments of field work and training."

He built up the staff "damned fast," Carpenter said, and when he left the company in 1920, there were 250 employes (about 125 of those qualified geologists) in the geology department.

Carpenter did consulting work and was employed by three other oil companies between 1920 and 1936 when he joined the Watchorn Oil & Gas Co., which now is Porter Oil & Gas Co.

Carpenter described the advances in oil exploration made during the 50-year span of his career as "enormous," but pointed out more insight, better procedures, and new techniques are a must for the future.

Personals

C. F. BEDFORD

Charles F. Bedford, general superintendent of Pan American Petroleum Corp.'s producing department, has been elected vice president in charge of production and a director of Pan American International Oil Co., a subsidiary. He transfers to New York from Tulsa. Bedford served as chief production engineer and North Texas-New Mexico division production superintendent before being named general superintendent of Pan Am's producing department in 1956. **J. D. Wells,** assistant to the chief engineer, and **C. Clark Fuller, Jr.,** petroleum engineer, senior grade, for Pan American Petroleum in Tulsa, have also been assigned to Pan American International. Wells will be chief production engineer. Fuller has been named staff engineer. Both will headquarter in New York.

Dr. George H. Fancher, University of Texas petroleum engineering department chairman, will spend 3 weeks in Bogota, Colombia, helping organize a department of conservation within the Colombian Ministry of Mines and Petroleum. He will also advise the ministry in formulating a national policy for petroleum conservation and in suggesting specific research studies of Colombian oil fields. Fancher has been named to represent Colombia as an official observer at Interstate Oil Compact Commission's Salt Lake City meeting June 23-25. Colombia is an associate member of IOCC.

C. M. Hartwell has been transferred by Cities Service Oil Co. from Lafayette, La., to Wichita Falls, Tex., where he will be superintendent of the company's new production division office. **Hugh L. Riley,** Oklahoma City, becomes superintendent of the reorganized Oklahoma production division, which has been enlarged. **Earl E. Ives,** superintendent of the old North Oklahoma division, Oklahoma City, has retired. District production superintendents in the Oklahoma division include **E. D. Blackburn,** Ponca City; **J. W. Wise,** Lindsay; and **R. L. Higginbottom,** Oklahoma City. In the Wichita Falls division, **A. C. Comstock** is district superintendent at Wichita Falls, and **M. A. Bolick** is Panhandle district superintendent at Pampa.

C. D. Watson, a director of Carter Oil Co., has retired. Watson was chief engineer of Carter before being named special assistant in charge of oil conservation in 1935. He became a director in 1932.

James W. Vickers, vice president in charge of marketing for Vickers Petroleum Co., has been elected a director. Vickers is also president of Kent Oil Co., Vickers marketing subsidiary, and is vice president in charge of pipeline and crude-oil purchasing for Vickers.

Dr. James A. Tong, president of Socony Mobil Oil Co. de Venezuela, has received the University of Arizona's 1958 alumni achievement award. He is a member of the university's class of 1918.

Alan Beerbower, chemical engineer at Esso Standard Oil Co.'s Baltimore refinery, has been transferred to Esso Research & Engineering Co. Beerbower was with Esso Research before going to Baltimore in 1946.

P. A. Dennie, formerly division exploitation engineer, has been named Roswell, N. M., production division manager for Shell Oil Co. He succeeds **W. E. Owen,** who has been transferred to Shell's New York production staff. **S. W. Clark,** division reservoir engineer at Roswell, moves up to succeed Dennie as division exploitation engineer. **C. P. St. Laurent,** formerly in production technical services, will replace Clark.

R. G. Strong, director of engineering for Natural Gas Pipeline Co. of America, has retired. He was chief engineer of the company before being named director of engineering. Active in association work, Strong was chairman of a joint API and AGA committee which developed the widely used system of standardized welding specifications. Strong has received two citations for his work in standardization.

Erving Arundale, assistant director of Esso Research & Engineering Co.'s technical service unit, has been named assistant director of the chemicals research division. **Robert F. Leary,** assistant director in chemicals research, moves to technical service in the same capacity. **Dr. Roy A. Westlund, Jr.,** recently on assignment with Esso Research, Ltd., in London, has been appointed a section head in Esso's chemicals research division. **Dr. John F. Ryan,** acting section head, becomes section head in chemicals development division.

M. A. (Mike) Wright and **Dr. Siro Vazquez** have taken on new executive posts with Standard Oil Co. (N. J.). Wright was elected a Jersey director at the company's recent annual meeting. His election increases the number of directors to 15. Vazquez, a director of Creole Petroleum Corp., will succeed Wright as coordinator of foreign production for Jersey. Wright, who joined the company in 1933 after graduation from Oklahoma A. & M.

M. A. WRIGHT

SIRO VAZQUEZ

College, has been coordinator of world-wide producing activities since 1954. Vazquez is a graduate of Central University of Venezuela, Caracas, and the University of Tulsa. He was with the Venezuelan Government's ministry of mines and hydrocarbons before joining Creole in 1937. He had been chief eastern division engineer, head of petroleum engineering, assistant production manager, and production manager before being named a director of Creole.

Dr. Earl Ingerson of U. S. Geological Survey will become professor of geology at the University of Texas in September.

Francis E. Foss, division production geologist in Tulsa for Shell Oil Co., has been transferred to Denver as production geologist.

William D. Stuart has been appointed executive assistant to the general manager of the Canadian Petroleum Association. **James M. MacNicol,** formerly with Canadian Petrofina, Ltd., and Royalite Hi-Way, Ltd., has joined the association as statistician. Stuart was with Imperial Oil, Ltd., before joining CPA in 1956.

Norman Parnell, formerly with Du Pont Co., and **Murray Greyson,** formerly with Houdry Process Corp., have been appointed research chemists at Cities Service Oil Co.'s Cranbury, N. J., research laboratory. **Robert Stone,** recent graduate of Massachusetts Institute of Technology, has been named associate engineer there. **Dr. Anthony Revukas,** formerly with Tidewater Oil Co., becomes group leader in motor gasolines at the Cranbury laboratory.

Personals

W. E. LOCHER

W. E. Locher, manager of operations for Trans-Arabian Pipe Line Co., and **W. A. Campbell,** manager of government relations, have been elected vice presidents of Tapline. Both will headquarter in Beirut, Lebanon. Locher has been with Tapline since 1950 and with affiliated companies since 1934. He was head of the pipeline division of Creole Petroleum Corp. before transferring to Tapline. Campbell was president of American Levant Shipping Co. in Beirut before joining Tapline in 1947.

A. C. Dahl, Lake Charles, La., division production manager for Shell Oil Co., will be division production manager of the new Lafayette, La., production division, formed by merger of the Lake Charles and Franklin, La., divisions. The new division will be organized by September 1. **A. R. Newman,** Franklin division production manager, has been transferred to Westwego, La., as Delta division production manager. He succeeds **A. T. Eyler, Jr.,** who has been appointed area chief exploitation engineer in New Orleans. Eyler's appointment sets off several changes in New Orleans. Transferring to New York will be **C. J. Ward,** formerly New Orleans chief exploitation engineer, and **W. E. Harpst,** area chief mechanical engineer. Ward will be senior exploitation engineer in the New York head office and Harpst will be manager of head office mechanical engineering. **J. E. Gallagher,** New York, transfers to New Orleans to succeed Harpst as area chief mechanical engineer. **F. D. Leigh,** senior mechanical engineer in the head office, becomes marine division production superintendent in New Orleans.

A. M. Braswell has been promoted to senior design engineer in the technical division at Humble Oil & Refining Co.'s Baytown, Tex., refinery. **B. B. Ashby** and **J. C. Dickson** have been named senior chemical engineers there. **R. A. Speed** has been appointed senior research chemical engineer in the research and development division at Humble's Baytown research center.

John J. Coates has been named manager of Esso Standard Oil Co.'s Pittsburgh grease plant. He succeeds **Carter Wasson,** manager since 1953, who has retired. Coates transferred to Pittsburgh as assistant plant manager a few months ago from Baton Rouge, La. He was formerly assistant head of the technical division at the Baton Rouge refinery.

E. A. McDaniel, formerly geologist with Carter Oil Co. in Vernal, Utah, has formed McDaniel Drilling Co. in Denver.

E. F. Liebrecht has been elected president of Kellogg International Corp., London, subsidiary of M. W. Kellogg Co. and president of Ste. Kellogg, French subsidiary. He will headquarter in London. Liebrecht will continue as a vice president of M. W. Kellogg Co. Also **Dr. R. E. Vener,** formerly with Catalytic Construction Co., has been named manager of industrial research for Kellogg.

J. T. DOYLE

John T. Doyle, manager of Shell Oil Co.'s Pacific Coast natural-gas department, has been appointed assistant to the vice president in charge of the Pacific Coast area. He succeeds **William F. Bates,** recently named manager of Shell's Pacific Coast production department. Doyle joined Shell in 1933 after graduation from the University of Maryland. He had been manager of the Pacific Coast natural-gas department since 1952.

Homer L. Spencer, Jr., recent graduate of Rice Institute, is joining The Texas Co. as chemical engineer at the company's West Tulsa refinery.

Lynn W. Stallings, Jr., mud engineer with Sun Oil Co. in Beaumont, Tex., has been transferred to Seabreeze, Tex., as production engineer.

Donald B. Priest, special assistant in the Los Angeles office of General Petroleum Corp., has been named coastal production division superintendent. He will headquarter in Ventura, Calif. Priest succeeds **A. McLean,** who is retiring after 44 years with the company. **J. J. Browne,** assistant to the San Joaquin division superintendent, will succeed Priest as special assistant in Los Angeles. **Donald F. J. McIntosh,** assistant to McLean in Ventura, will transfer to Taft, Calif., to succeed Browne. McLean, retiring division superintendent, was drilling foreman for the company at Santa Barbara, Calif., and Ventura before being named coastal division head in 1938.

D. M. Curran, who recently resigned as president of M. J. Crose Manufacturing Co., Inc., has been named senior vice president of Williams Brothers Co., pipeline engineers and constructors, Tulsa. Curran in recent years with Crose has been instrumental in developing new equipment used in pipeline construction.

Z. F. Baczewski, senior technologist at Shell Oil Co.'s Houston refinery, has been transferred to the New York office of Shell Chemical Corp. as senior technologist, manufacturing development department.

T. H. Milliken, Jr., has been appointed director of planning in M. W. Kellogg Co.'s research and development department. Milliken has been with Sun Oil Co. and was formerly assistant director of research for Houdry Process Corp.

Charles O. Peyton, head of the technical division at Esso Standard Oil Co.'s Baton Rouge, La., refinery, has been transferred to New York as assistant general manager of the new petroleum specialties department.

Walt Granata, geologist with Sohio Petroleum Co., has been transferred to Lafayette, La., from Houston.

Robert B. Arnold, senior petroleum engineer with Carter Oil Co., has been transferred to Tulsa from Magnolia, Ark.

J. F. Rominger, head of the geology section of International Petroleum (Colombia), Ltd., has transferred to Esso Standard (Libya), Inc., as chief geologist. He will headquarter in Tripoli. Rominger had been in Colombia since 1953.

A. Carl Tutschulte, assistant western division petroleum engineer for Tidewater Oil Co., moves up to division petroleum engineer. He succeeds **Roy S. Curl,** who has retired after 36 years with Tidewater. Tutschulte will headquarter in San Francisco.

R. N. Knoblock, petroleum engineer with The Texas Co. in Tulsa, has been promoted to Illinois district petroleum engineer and transferred to Salem, Ill.

Personals

E. J. JANDACEK

E. J. Jandacek, assistant chief engineer for Texas Gas Transmission Corp., has moved up to chief engineer. He succeeds **H. L. Stowers,** vice president of the company, who has served as both vice president and chief engineer for the past year. A graduate of the University of Wisconsin, Jandacek joined Texas Gas in 1949.

E. H. Babitzke, petroleum engineer, has been transferred to Fort Worth from Pampa, Tex., by The Texas Co.

Dr. George P. Baumann and **George Claypole** have been appointed engineering associates by Esso Research & Engineering Co. Both have recently returned from foreign assignments. Claypole was in England, Baumann, in Japan.

Beverley Matthews, partner in McCarthy & McCarthy, Toronto law firm, and director of British American Oil Co., Ltd., since 1955, has been elected a director of Gulf Oil Corp.

Winfield S. Hull, senior petroleum engineer with Sinclair Oil & Gas Co., has been transferred to Fort Worth from Tulsa.

Max Newsom, geologist with Gulf Oil Corp. in Jackson, Miss., has been temporarily assigned to Gulf Research & Development Co. as geologist in Casper, Wyo.

Margarete Applegate, Sun Oil Co., geologist in Mount Pleasant, Mich., has been elected president of the Michigan Basin Geological Society succeeding **Thad Vance,** Panhandle Eastern Pipe Line Co., who was recently transferred to Liberal, Kans.

Samuel Roberson, president of El Dorado Refining Co., El Dorado, Kans., will resign September 1 to become vice president of the Citizens State Bank of El Dorado.

Alex Boardman, Denver staff geologist for British-American Oil Producing Co., has been transferred to Anchorage, Alaska, on temporary assignment. **Lloyd Miller,** Denver district geologist, will succeed Boardman during this assignment.

FLOYD BRETT

Floyd Brett, vice president of Sinclair Oil & Gas Co., will succeed **W. R. (Dick) Thixton** as head of the Tulsa division. Thixton, vice president and Tulsa division manager for the past 4 years, has retired. Thixton has been with the company since 1934 and was Tulsa division exploration manager before becoming division manager. Brett was Midland, Tex., division manager before transferring to Tulsa in February. He has been vice president since 1956.

Bruce W. Watson, manager of the land department of Canadian Homestead Oils, Ltd., has been elected a vice president. Watson is a vice president of Ranchmen's Oils, Ltd., and is a director of Palliser Petroleums, Ltd., and Petcal Co., Ltd.

C. W. MARVIN

Conrad W. Marvin has been promoted from supervising engineer to assistant chief engineer by Texas Eastern Transmission Corp. as one of a series of promotions of key personnel in its engineering department. Marvin joined the company as gas engineer in 1947, was promoted to chief of the engineering plans and research division in 1951, and to supervising engineer in 1956. **Jay J. Ball** has been moved up from assistant supervising engineer to supervising engineer to replace Marvin. **George H. Ewing,** formerly supervisor of plans and research, becomes assistant supervising engineer. And **Gordon L. Jennings,** formerly assistant supervisor of engineering plans and research, becomes supervisor of that department.

F. Henry Callaway, formerly with Keller & Peterson, Fort Worth consultants, has joined Leibrock, Landreth & Campbell, Midland, Tex., consulting firm, as a partner. The company will be known as Leibrock, Landreth, Campbell, & Callaway. Callaway was reservoir engineering supervisor for Pan American Petroleum Corp., then Stanolind Oil & Gas Co., before becoming a consultant in 1955.

Leland A. Smith, general manager of the marine division of California Texas Oil Co., Ltd., has been elected a vice president of Caltex Service Co., division of California Texas Oil Co. He will be in charge of marine matters for the Caltex fleet of 123 owned and chartered tankers.

DEATHS

L. J. Hutchinson, 75, Mounds, Okla., independent operator and drilling contractor, died May 29.

Friend Grimes, 74, Grand Rapids, Mich., president of Marvel Refining Co., died May 24.

George C. Huff, 69, Seminole, Okla., tool pusher with Wolfe Drilling Co. and partner in Gardner, Huff, & Clark, oil producers, died recently in Seminole. He had been with Wolfe Drilling since 1917.

Louie (Buck) Thompson, 66, retired supervisor of transportation for the old Deep Rock Oil Corp., died May 29 in a Cushing, Okla., hospital. Thompson joined Mays Oil Co. in Cushing after retiring from Deep Rock in 1950.

Clarence White, 63, president of Oil Well Manufacturing Corp. and White Heat Treatment Co., died May 26 in Los Angeles.

Jack E. Clemens, 58, Houston division manager for Martin-Decker Corp., died May 19. Clemens had been with Martin-Decker since 1929.

Russell Norman Zick, 39, manager of the Mexico City sales office of Dow Chemical Inter-American, Ltd., and director and treasurer of Dow's subsidiary and associated companies in Mexico, died May 27 in Mexico City after a heart attack.

George Albert Lyford, Jr., operator of Lyford & Wolf Drilling Co., Bartlesville, Okla., until his retirement in 1950, died June 2 in Bartlesville.

Fred Barkis, 65, pioneer independent operator in the Signal Hill field, died June 2 at his home in Long Beach, Calif.

John E. Scott, 51, supervisor of production accounting for Sunray Mid-Continent Oil Co., died May 30 in Tulsa after a 2-month illness. He had been with the company for 21 years.

A quick look at the highlights . . .

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,217,675	DOWN	13,525	DOWN	1,191,862
Crude stocks	269,825,000	DOWN	3,130,000	UP	4,364,000
Completions	892	DOWN	80	DOWN	29
Refinery runs	7,487,000	UP	156,000	DOWN	645,000
Gasoline stocks	193,355,000	DOWN	2,398,000	DOWN	1,930,000
Kerosine stocks	21,469,000	UP	760,000	DOWN	3,551,000
Distillate stocks	87,858,000	UP	3,394,000	DOWN	9,161,000
Residual stocks	61,383,000	UP	1,030,000	UP	21,316,000
Four-product stocks	364,065,000	UP	2,786,000	UP	6,674,000
Total imports	1,225,800	DOWN	98,000	DOWN	366,200

BY JOHN C. CASPER
Economics Editor

Medicine was bitter, but it worked

. . . except in still over-stocked California

HEAVY REDUCTIONS in petroleum supply over the past 3 months have worked wonders in bringing stocks down to reasonable levels in all areas except California. The change is showing up as reduced pressure on product prices.

At the end of February, crude and four-product stocks were 57,248,000 bbl. higher than the year before. This excess was about evenly split between crude and products, but it was badly out of balance by areas. Increases on the West Coast accounted for 38,373,000 bbl. of the total and all other districts 18,875,000 bbl.

HOW STOCK POSITIONS HAVE CHANGED SINCE FEBRUARY

(Thousands of barrels)

	Stocks 5-30-58	Stocks 5-31-57	May Change over 1957	February Change over 1957
	Total United States			
Gasoline	193,355	194,770	— 1,415	10,660
Kerosine	21,469	25,545	— 4,076	— 3,811
Distillate	87,858	98,135	—10,277	2,801
Residual	61,383	41,125	20,258	18,894
4 products	364,065	359,575	4,490	28,544
Crude	*269,825	275,963	— 6,138	28,704
Crude and 4 products	633,890	635,538	— 1,648	57,248
	West Coast			
Gasoline	26,861	27,862	— 1,001	2,662
Kerosine	298	356	— 58	40
Distillate	12,010	11,009	1,001	4,766
Residual	31,929	13,591	18,338	17,269
4 products	71,098	52,818	18,280	24,737
Crude	*43,969	31,377	12,592	13,636
Crude and 4 products	115,067	84,195	30,872	38,373
	East of District 5			
Gasoline	166,494	166,908	— 414	7,998
Kerosine	21,171	25,189	— 4,018	— 3,851
Distillate	75,848	87,126	—11,278	— 1,965
Residual	29,454	27,534	1,920	1,625
4 products	292,967	306,757	—13,790	3,807
Crude	*225,856	244,586	—18,730	15,068
Crude and 4 products	518,823	551,343	—32,520	18,875

*Crude report 1 week earlier.

For areas east of District 5, most of the gain was in crude. Major product stocks in these districts were up only 3,807,000 bbl.

Current stock comparisons show remarkable improvement in the picture for two reasons. Petroleum supply has been cut below normal since the end of February and supply was much too high in the same period last year.

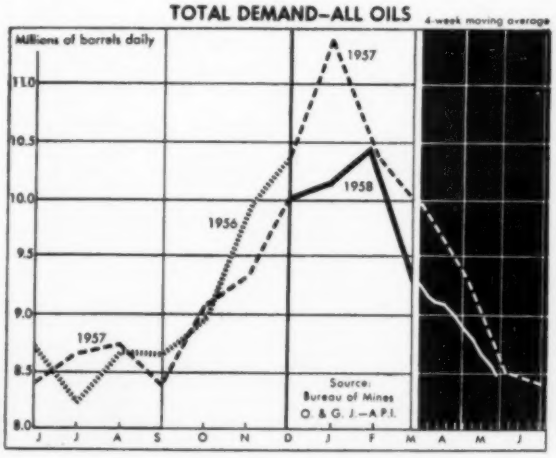
The table shows that crude stocks are now below 270,000,000 for the first time in about a year. On the West Coast, crude on hand is still 12,592,000 bbl. above last year. In other areas. stocks are down 18,730,000 bbl. to 225,856,000 bbl. or about the normal working level.

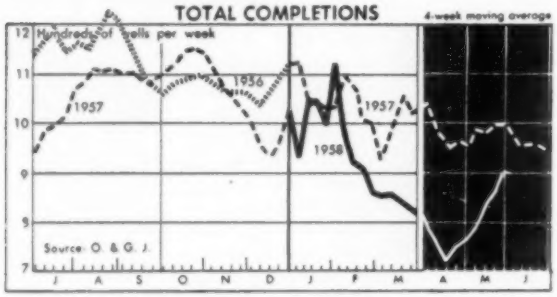
West Coast product stock position has not changed much since February. The four-product total is still up 18,280,000 bbl. over last year compared with a gain of 24,737,000 bbl. at the end of February.

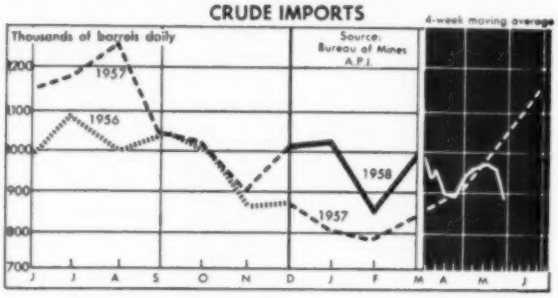
Major product stocks east of California now total only 292,967,000 bbl., down 13,790,000 bbl. from the total reported for May 31 last year.

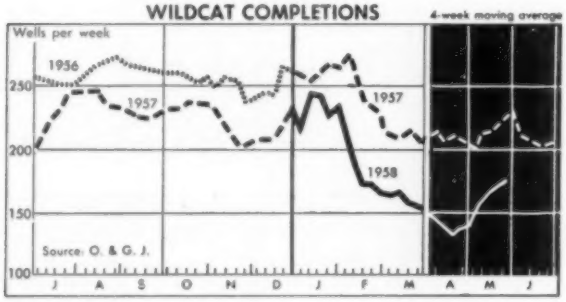
With crude stocks near normal, supply corrections for June should be in product stocks through restricted refinery runs.

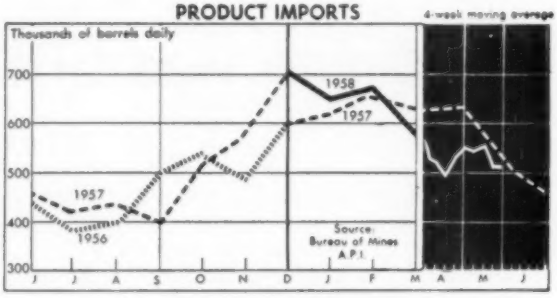
TOTAL DEMAND–ALL OILS 4 week moving average







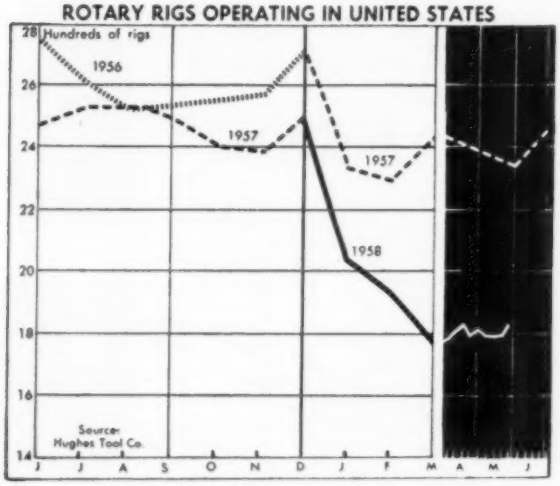




WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 31, 1958

	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1958	1957	Total	Crude	Cond.	Gas	Dry	1958	1957
Alabama	0	0	0	0	0	0	0	29	49	0	0	0	0	0	10	19
Arkansas	10	1	0	1	8	0	33,470	265	393	7	0	0	1	6	68	65
California	25	14	0	2	9	0	113,980	750	898	7	0	0	0	7	152	222
Colorado	9	2	0	1	6	0	51,829	302	364	5	1	0	0	4	159	244
Illinois	42	18	0	0	24	0	89,980	774	1,010	5	0	0	0	5	159	248
Indiana	13	3	0	0	10	0	17,876	267	266	7	0	0	0	7	103	54
Kansas	84	36	0	4	39	5	289,695	1,481	1,712	21	3	0	2	16	300	334
Kentucky	15	5	0	4	6	0	25,633	373	583	2	0	0	0	2	45	114
Louisiana	69	33	7	3	26	0	571,670	1,360	1,556	11	0	1	1	9	198	274
North	19	8	0	3	8	0	66,861	454	526	4	0	0	1	3	73	59
South	37	19	6	0	12	0	380,911	712	730	7	0	1	0	6	110	177
Offshore	13	6	1	0	6	0	123,898	194	300	0	0	0	0	0	15	38
Michigan	7	5	0	0	2	0	21,346	157	166	1	0	0	0	1	50	68
Mississippi	4	2	0	0	2	0	40,838	155	155	2	0	0	0	2	80	75
Montana	4	2	0	0	2	0	28,196	144	141	2	0	0	0	2	61	50
Nebraska	13	3	0	0	10	0	78,298	265	336	6	0	0	0	6	124	189
New Mexico	32	20	0	4	8	0	162,599	768	828	5	0	0	0	5	106	117
West	7	2	0	3	2	0	35,002	350	309	1	0	0	0	1	46	43
East	25	18	0	1	6	0	127,597	418	519	4	0	0	0	4	60	74
New York	10	5	0	0	0	5	13,500	227	195	0	0	0	0	0	14	1
North Dakota	2	1	0	0	1	0	13,800	174	118	2	1	0	0	1	57	46
Ohio	18	9	0	3	6	0	42,414	418	428	1	0	0	1	0	5	3
Oklahoma	168	77	6	13	64	8	477,002	2,738	2,665	15	0	2	0	13	366	312
Pennsylvania	0	0	0	0	0	0	0	184	337	0	0	0	0	0	6	33
Texas	342	190	17	7	125	3	1,415,261	7,461	9,148	71	7	2	0	62	1,544	2,371
District 1	30	7	0	0	23	0	87,085	418	515	20	1	0	0	19	169	177
District 2	16	4	2	4	6	0	84,163	305	304	5	1	1	0	3	81	123
District 3	23	9	2	1	11	0	130,448	533	747	3	0	0	0	3	110	238
District 4	29	6	2	1	20	0	154,923	502	616	7	0	0	0	7	151	235
East	16	7	3	0	6	0	82,032	509	509	4	1	0	0	3	142	151
District 7-B	46	21	1	0	23	1	102,703	971	1,230	16	3	1	0	12	279	464
West	100	85	0	0	15	0	496,960	2,218	2,580	10	0	0	0	10	306	399
District 9	59	36	3	0	18	2	179,066	1,485	2,079	5	1	0	0	4	262	544
District 10	23	15	4	1	3	0	97,881	520	568	1	0	0	0	1	44	40
Utah	2	2	0	0	0	0	11,501	183	73	0	0	0	0	0	32	42
West Virginia	13	3	0	8	2	0	30,262	282	251	0	0	0	0	0	9	11
Wyoming	10	6	0	0	4	0	53,074	302	340	2	0	0	0	2	87	115
Miscellaneous	0	0	0	0	0	0	0	40	29	0	0	0	0	0	34	24
Total U. S.	**892**	437	30	50	354	21	3,582,224	19,099	22,041	**172**	12	5	5	150	3,769	5,031
Total prev. week	972	457	27	111	333	44	3,814,614	.....	.....	180	18	3	3	156	.....	.....
Cum. 1958	19,099	9,487	482	1,425	7,262	443	80,971,401	.....	.....	3,769	354	65	121	3,229	.....	.....
Western Canada	31	19	0	1	11	0	119,984	920	1,044	5	1	0	1	3	331	282

ROTARY RIGS OPERATING IN UNITED STATES

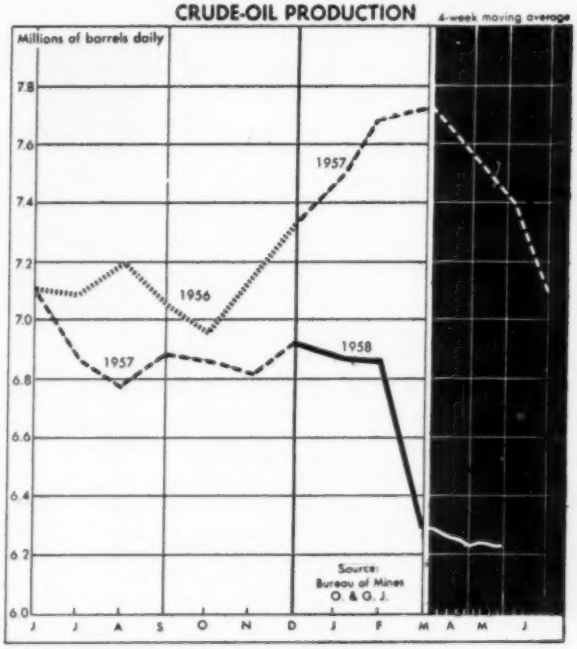


ACTIVE ROTARY RIGS*

	6-2-58	5-26-58	5-19-58	6-3-57
Alabama	5	7	5	10
Arkansas	24	11	13	24
Arizona				
California	81	75	86	97
Colorado	33	30	26	42
Florida	1	1	2	1
Georgia	1			
Idaho				
Illinois	54	54	54	40
Indiana	7	10	8	4
Iowa	3	3	3	2
Kansas	134	128	114	149
Kentucky	9	7	6	7
Louisiana	279	281	277	438
North	39	36	34	54
South	197	201	202	286
Offshore	43	44	41	98
Maryland				
Michigan	9	7	11	10
Missouri				1
Montana	19	21	22	32
Mississippi	39	37	33	32
Nebraska	28	30	23	40
Nevada				
New Mexico	129	128	131	143
New York	2	2	2	1
North Dakota	37	33	37	24
Ohio				1
Oklahoma	176	188	190	232
Oregon	1	1	1	1
Pennsylvania	10	10	10	15
South Dakota				2
Texas	642	640	646	944
Gulf Coast	121	129	144	191
Offshore	3	4	4	4
West	258	264	266	371
North	215	203	195	313
East	45	40	37	65
Tennessee				
Utah	36	37	38	44
Washington				
West Virginia	5	5	6	
Wyoming	58	52	48	75
Virginia				
Total United States	1,822	1,798	1,792	2,411
Western Canada	160	160	128	222
Eastern Canada	1	2	2	1
Grand total	1,983	1,960	1,922	2,634

*Hughes Tool Co.

CRUDE-OIL PRODUCTION

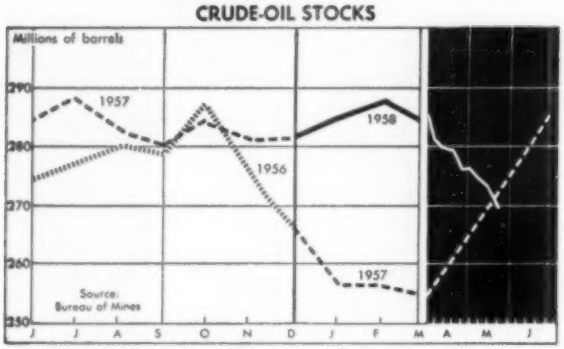


DAILY AVERAGE PRODUCTION FOR WEEK

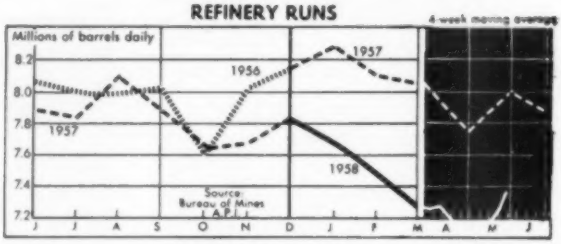
	May 31, 1958			May 24
	Crude oil	Lease condensate	Total	total
Alabama	14,900		14,900	14,950
Arkansas	75,475	200	75,675	75,700
California	855,600		855,600	856,200
Colorado	136,325		136,325	136,750
Eastern	50,400		50,400	49,800
Florida	1,275		1,275	1,275
Illinois	219,200		219,200	220,900
Indiana	30,800		30,800	28,600
Kansas	†325,200		†325,200	†319,025
Kentucky	42,100		42,100	42,500
Louisiana	725,850	86,600	812,450	815,450
North	110,850	3,000	113,850	116,850
South	615,000	83,600	698,600	698,600
Michigan	26,200		26,200	25,800
Mississippi	97,450	5,000	102,450	102,450
Montana	70,900		70,900	75,150
Nebraska	51,100		51,100	48,100
Nevada	100		100	100
New Mexico	246,850	6,500	253,350	253,350
North Dakota	39,350		39,350	37,100
Oklahoma	†541,700		†541,700	†554,200
Texas	2,134,000	64,000	2,198,000	2,198,000
Dist. 1	45,000	400	45,400	45,400
Dist. 2	87,000	9,000	96,000	96,000
Dist. 3	315,000	32,000	347,000	347,000
Dist. 4	152,000	7,600	159,600	159,600
Dist. 5	25,000	500	25,500	25,500
Dist. 6	91,000	7,000	98,000	98,000
East Texas field	116,000		116,000	116,000
Dist. 7-B	122,000	100	122,100	122,100
Dist. 7-C	110,000	3,650	113,650	113,650
Dist. 8	775,000	1,600	776,600	776,600
Dist. 9	190,000	1,500	191,500	191,500
Dist. 10	106,000	650	106,650	106,650
Utah	67,500		67,500	72,500
Wyoming	302,950		302,950	303,150
Others	‡150		‡150	‡150
Total U. S.	6,055,375	162,300	**6,217,675**	6,231,200
Change from prev. week, down			**13,525**	
Canada	†416,000		†416,000	†411,900
Total U. S. prod., Jan. 1-May 31				979,118,175 bbl.
Same period last year (crude plus cond.)				*1,143,119,979 bbl.

*Includes 21,496,750 bbl. condensate. †Week ended previous Monday. ‡South Dakota.

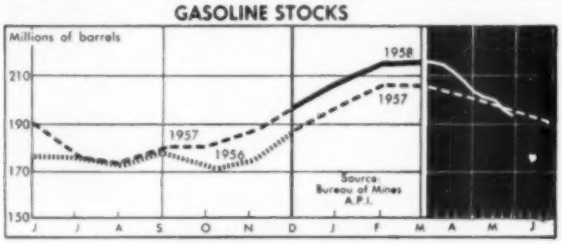
CRUDE-OIL STOCKS



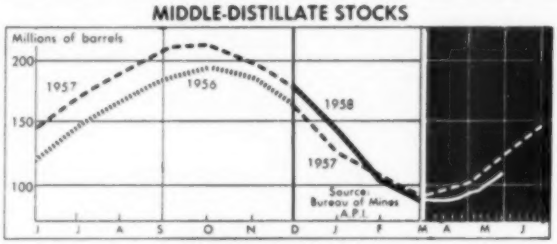
REFINERY RUNS



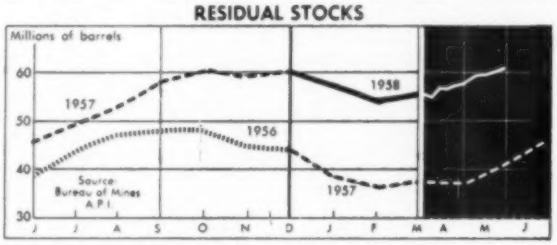
GASOLINE STOCKS



MIDDLE-DISTILLATE STOCKS



RESIDUAL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	5-24-58	5-17-58	5-25-57
Pennsylvania Grade	2,929	2,948	2,694
Other Appalachian	1,462	1,472	1,923
Illinois, Indiana, and Michigan	10,937	11,197	9,096
Nebraska and North Dakota	2,131	2,116	1,675
Kansas	10,741	10,694	11,094
Oklahoma	17,103	17,331	21,262
Arkansas	2,480	2,484	2,810
Louisiana	17,309	17,694	18,851
North	2,999	2,902	2,980
South	14,310	14,792	15,871
Mississippi, Alabama, and Florida	2,098	2,369	2,547
New Mexico	7,695	7,612	8,304
Texas	114,670	117,120	123,335
East Texas	7,867	7,623	11,720
West Texas	53,910	54,621	58,502
Texas Gulf	22,635	24,093	23,011
Other Texas	30,258	30,783	30,102
Wyoming	16,020	15,669	16,832
Other Rocky Mountain	7,637	7,519	6,265
California	39,541	38,959	25,611
Foreign	†17,072	17,771	13,162
Total	269,825	272,955	265,461

*Bureau of Mines. †Includes 4,428,000 bbl. in California.

API REFINERY REPORT, MAY 30, 1958

(Thousands of barrels)

District—	Daily avg. runs	Daily average production— Gaso.*	Kero.	Dist.	Resid.	Stocks‡— Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, May 1957— Daily avg. runs	Daily average production— Gaso.*	Kero.	Dist.	Resid.
East Coast	1,056	492.0	19.9	308.0	150.7	45,342	8,428	27,184	12,501	1,217	481.2	30.3	321.7	205.3
Appalachian:														
District 1	95	42.4	2.1	19.9	3.1	4,730	522	1,949	580	94	33.8	4.1	19.8	5.0
District 2	75	50.1	2.1	14.1	5.1	2,283	328	929	379	92	54.5	4.6	15.1	11.6
Ind., Ill., Ky.	1,379	702.4	70.2	295.6	167.7	36,299	4,458	14,411	5,036	1,425	688.6	67.1	271.7	155.8
Minn., Wis., Dak.	107	51.6	4.0	28.9	10.3	6,469	849	4,207	554	102	48.4	6.7	27.2	7.5
Okla., Kans., Mo.	750	410.7	22.4	181.1	27.4	17,156	1,109	7,876	836	700	385.7	19.0	162.9	22.8
Inland Texas	260	195.4	9.2	38.6	13.9	6,932	344	1,394	2,035	269	198.9	7.2	51.0	20.4
Texas Gulf Coast	1,697	849.0	52.7	439.8	211.1	25,331	2,534	9,568	5,097	1,877	904.4	78.8	467.8	226.7
La. Gulf Coast	589	355.6	28.4	173.4	36.4	9,470	1,525	4,000	1,306	652	353.5	45.1	190.3	50.9
N. La. and Ark.	99	36.9	7.1	23.0	4.7	5,010	845	1,775	141	83	27.6	3.6	21.9	4.7
Rocky Mountain:														
New Mexico	23	9.9	1.1	4.7	2.9	635	23	141	68	24	11.9	0.3	4.7	2.5
Other Rocky Mtn.	269	119.9	2.9	50.9	34.6	6,837	206	2,414	921	253	120.8	1.5	57.1	32.1
West Coast	1,088	461.0	2.0	131.1	308.7	26,861	298	12,010	31,929	1,204	522.6	4.0	177.3	357.8
May 30, 1958	7,487	3,776.9	224.1	1,709.1	979.6	193,355	21,469	87,858	61,383	7,992	3,831.9	272.3	1,788.5	1,103.1
May 23, 1958	7,331	3,668.4	244.9	1,693.3	943.9	195,753	20,709	84,464	60,353	.....	.....	.....	.....	.....
May 31, 1957	8,132	3,925.1	302.7	1,865.0	1,143.3	195,285	25,020	97,019	40,067	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):	
Regular (89 octane)	11.25-11.50
★ Premium (99 octane)	14.25-14.50
Gulf Coast (cargoes for coastwise or export movements):	
Regular (90 octane)	9.75-10.25
Regular (92 octane)	10.00-10.50
Premium (97 octane)	11.375-11.75
Premium (98 octane)	11.875-12.50
California (rack) (Los Angeles):	
Regular (88 octane)	12.0
Premium (96 octane)	14.5
Premium (98 octane)	15.0
Caribbean area (cargoes):	
Regular (87 octane)	9.625
Premium (98 octane)	12.125

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:	
Grade 26-70	4.5
Breckenridge:	
Grade 26-70	4.0

*If 26-70 natural is considered as 100 per cent, prices for lower-vapor-pressure grades increase 2.5 per cent for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):	
Kerosine 42-44	9.25-9.50
Diesel oil (58 d.i. and above)	8.875-9.125
Distillate No. 1	8.875-9.125
Distillate No. 2	8.25-8.50
Gulf Coast (cargoes):	
Kerosine 41-43	8.50-8.75
Distillate No. 2	8.00-8.25
New York Harbor (barges):	
Kerosine 41-43	9.35
Distillate No. 2	8.85
Diesel fuel, 48-52 d.i.	9.45
Caribbean area (cargoes):	
Distillate No. 2	8.125

WAX (LB.)

Oklahoma (Group 3):	
132-135 A.m.p. (semi-refined) in tank cars	6.50
New York (export):	
126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
Residual fuel (max 1% S)	$1.25-1.30
Gulf Coast (cargoes):	
Bunker C fuel	$2.20-2.25
New York Harbor (barges):	
Bunker C fuel	$2.57
Caribbean (cargoes):	
Bunker C	$2.25
California (rack):	
Bunker C fuel, Los Angeles	$2.45

LUBRICATING OILS

Mid-Continent (Group 3):	
150-160 bright stock, solvent refined, 0-10 p.p., 95 v.i.	23.0
200 vis. neutral oil, solvent refined, 0-10 p.p., 95 v.i.	20.5
Pennsylvania Grade:	
★ 145-155 vis. at 210, bright stock, 8 color, 25 p.t.	24
★ 200 vis. neutral (180° at 100°), 25 p.t.	22

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	Mid-Cont.*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour)
14-14.9	$2.47	....	....	....	....
15-15.9	2.52	....	....	....	$1.81
16-16.9	2.58	....	....	....	1.86
17-17.9	2.63	....	....	....	1.91
18-18.9	2.69	....	....	....	1.96
19-19.9	2.74	....	....	....	2.01
20-20.9	2.80	$2.75	....	$2.62	2.06
21-21.9	2.85	2.77	....	2.64	2.11
22-22.9	2.91	2.79	....	2.66	2.16
23-23.9	2.96	2.81	$3.44	2.68	2.21
24-24.9	3.02	2.83	3.46	2.70	2.26
25-25.9	3.07	2.85	3.48	2.72	2.31
26-26.9	3.13	2.87	3.50	2.74	2.36
27-27.9	3.17	2.89	3.52	2.76	2.49
28-28.9	3.22	2.91	3.54	2.78	2.54
29-29.9	3.27	2.93	3.56	2.80	2.59
30-30.9	3.32	2.95	....	2.82	2.63
31-31.9	3.38	2.97	....	2.84	2.67
32-32.9	3.44	2.99	....	2.86	2.71
33-33.9	3.50	3.01	....	2.88	2.75
34-34.9	3.56	3.03	....	2.90	2.79
35-35.9	3.61	3.05	....	2.92	2.83
36-36.9	3.65	3.07	....	2.94	2.87
37-37.9	3.68	3.09	....	2.96	2.89
38-38.9	....	3.11	....	2.98	2.91
39-39.9	....	3.13	....	3.00	2.93
40 and up	....	3.15	....	3.02	2.95

*Includes Oklahoma (sweet), part of Kansas, North Dakota, W. Texas (sweet). Some Oklahoma available for 15 cents less starting 3-17-58 and other at 10 cents less on 4-1-58. †Low cold test crude. ‡Sour.

Effective dates of broad changes: California, 4-14-58; east of California, January 3-10, 1957; Pennsylvania Grade 4-16-58.

FLAT PRICES

Louisiana:	
Bienville (distillate)	$3.05
Ville Platte	3.45
Texas:	
East Texas	3.25
Conroe	3.53
Van	3.08
Pennsylvania Grade:	
Bradford	4.15
Middle District	3.97
Southwest Pennsylvania	3.68
West Virginia	3.50
Buckeye Grade	3.50
Illinois Basin	3.00
Canada:	
Leduc-Woodbend	2.67
Redwater (Alta.)	2.56
Smiley (Sask.)	2.33
Pembina	2.52

FOREIGN

Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.75
San Joaquin, 41°-41.9°, Puerto La Cruz	3.34
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26°-26.9°, Amuay*	2.55
Quiriquire, 16.0°-16.4°, Caripito	2.30
Lagunillas heavy, flat, Amuay or Las Piedras*	2.25
Bachaquero, flat, 15°-16°, Las Piedras*	2.08

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):	
Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Abadan	1.99
Iraq, 35.0°-35.9°, Fao	1.98
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.23
Middle East, E. Mediterranean:	
Arabian, 36.0°-36.9°, Sidon	2.49
Iraq, 36.0°-36.9°, Tripoli, Banias	2.49
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.75

TANKER RATES PER LONG TON

(Latest reported spot fixtures)

★ Gulf-U.S.N.H., clean (USMC—27.5%)	$2.07
Gulf-U.S.N.H., dirty (USMC—35%)	1.85
★ Carib.-U.S.N.H., dirty (USMC—57.5%)	1.15
★ Sidon-U.S.N.H., dirty (USMC—70%)	2.34

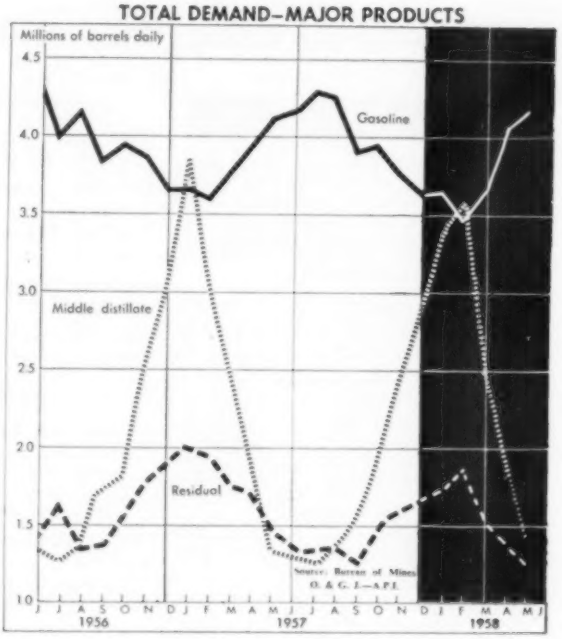
SUPPLY AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

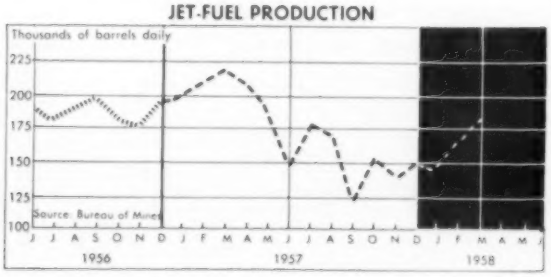
	Total demand	Refinery production	Stocks end of period†
GASOLINE			
May 1958*	4,130	3,670	193,000
April 1958*	4,070	3,560	203,180
March 1958	3,564	3,586	218,705
June 1957	4,156	3,881	190,063
May 1957	4,114	3,832	195,094
KEROSINE			
May 1958*	140	240	21,500
April 1958*	230	280	18,640
March 1958	357	337	16,706
June 1957	142	254	28,872
May 1957	147	272	25,374
DISTILLATE			
May 1958*	1,290	1,665	88,200
April 1958*	1,585	1,600	76,050
March 1958	2,094	1,650	75,315
June 1957	1,150	1,773	117,364
May 1957	1,185	1,789	98,060
RESIDUAL			
May 1958*	1,260	955	61,500
April 1958*	1,390	950	57,990
March 1958	1,648	1,015	54,929
June 1957	1,387	1,101	45,572
May 1957	1,485	1,103	41,036

*Preliminary. †Thousands of barrels.

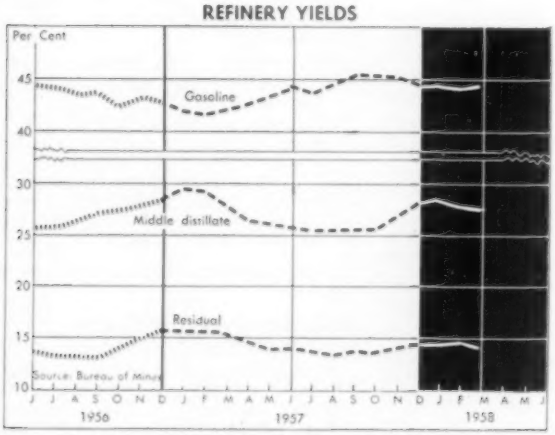
TOTAL DEMAND–MAJOR PRODUCTS



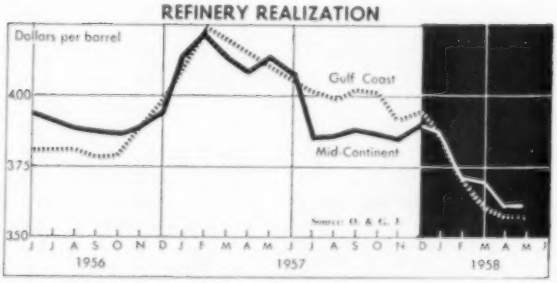
JET-FUEL PRODUCTION



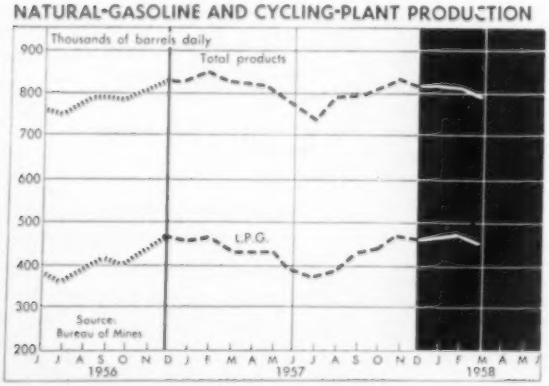
REFINERY YIELDS



REFINERY REALIZATION



NATURAL-GASOLINE AND CYCLING-PLANT PRODUCTION



REFINERY REALIZATION

	May* 1958	Apr.* 1958	Mar. 1958	May 1957
Mid-Continent	$3.61	$3.60	$3.59	$4.14
Gulf Coast	3.58	3.57	3.60	4.10

*Preliminary.

Refinery realization is based on yields of major products and average spot prices of regular gasoline, kerosine, No. 2 fuel, and residual as published in The Oil and Gas Journal.

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13750 KVA Natural Gas Engine Power Plant consisting of 11—1250 KVA 3/60/2400/4160 Generator Sets will be sold individually. Can be inspected on foundations. Write for pictures and details. HEAT & POWER CO., INC. 60 E. 42 St., NEW YORK CITY

MAGNETOMETER Askania Vertical temperature compensated ten gammas perfect condition $900.00. Box K-685, The Oil and Gas Journal, Tulsa, Oklahoma.

44 FRANKS DOUBLE DRUM Pulling Unit, mounted on 190 International (1950), excellent rubber, 7000' 5/8" sand line. Complete with all tubing and rod tools. Inventory on request. Ross Maddux, Phone 4599, 412 Federal National Bank Building, Shawnee, Oklahoma.

FOR SALE
NEW LINE PIPE

8265'—20" O.D. x .375 wall, new prime grade, A. O. Smith EW, PE beveled, range 3, Spec. 5L-X52.
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Priced Below Mill Quotations
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1500 HP D.C. MOTORS

1500 HP—525 volts D.C.—600 R.P.M.—NEW—2-bearing continuous duty motors—manufactured by Westinghouse. In original crates. From Navy Destroyer Escort. SPECIFICATIONS: 2-bearing 1500 HP—525 volts DC—2270 amps—600 RPM—ambient temperature 40° C—class B insulation—2-bearing pedestal sleeve type—shunt wound—efficiency 94.23% ONLY 6 AVAILABLE—BUY NOW AND SAVE. Suitable for steel mill drive—offshore oil rigs—rolling mill drive—dredge pump applications.

1200 KW GENERATORS

(2) Equal to new—manufactured by Allis-Chalmers. 1200 KW—525 volts D.C. 2290 amps—750 RPM—cooling self-ventilated—totally enclosed—separate excitation—continuous duty—class B insulation—Mfg. type M.H.C.—frog leg armature

The Boston Metals Co.
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8⅝" 28 LB. LAPWELD line pipe, 600,000 ft. No. 1 grade. Indiana-Ohio Pipe Co. P. O. Box 323. Phone 3-4674, Decatur, Indiana.

NEW BOILERS Unassembled B&W Comb. Engr. Foster Wheeler 35,000#: 44,500#: 60,000#: 122,500#: 153,000# Steam per hour Working Pressures from 285 to 565 with Superheaters, Economizers, Water Walls and Oil Burners complete. SAVE ½. Write for pictures and details. HEAT & POWER CO., INC., 60 E. 42nd St., New York City.

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w/Hyd. Jacks & Steel Beams for skidding drilling rigs; 15 Ton, 20 Ton & 30 Ton capacity.

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Explosion Proof Westinghouse Type CS Frame 775S—1789 RPM—440 V.—60 Cycle, 3 phase—Style 11 N 8911 with Falk 13 F Coupling and 150 H.P.—G.E. Starting Compensator Class CR-1034-K-1.

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1—Clark Triplex pump, 3½"x8", 2040 barrels, can be used up to 1800 lbs. sq. inch **$2500.00**
1—Deming 2¼" Triplex pump—650 barrels at 650 lbs. **$375.00**
Pumps equipped with stainless steel plunger and bronze valves. Pumps slightly used, excellent condition.
2—iron filters for water flood. Good for 5000 barrels per day.
2—used Chemical Feeders.

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TANKS & TOWERS

14' x 21' x 1" Shell, Steel
12' x 43' x 3/8" Shell, Steel
8½' x 19' x ¼" Shell, T-316SS
14" x 40' Tower, 160#
18" x 23' Tower, 160#
24" x 28' Tower, 550#

8' x 75', 20 Tray, 25#
5' x 98', 40 Tray, 135#
24" x 45', 24 Tray
18" x 32', 15 Tray, 160#
24" x 42', 22 Tray, 230# T-304SS
12" x 24' 12 Tray T-316SS
30" x 20', 8 Tray, 50# T-304SS

Valves: Steel & SS ½" through 6"
Furnaces: Petro-Chem, ½, ¾ mil. BTU-HR.

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Braun 3,300 sq. ft., steel, new
Steel Tube: 1000, 900, 650, 500, 300, 200, sq. ft.
Adm. Tube: 2250, 2200, 1300, 900, 740, 625, 300 sq. ft.
S.S. Tube: 1228, 947, 570, 536, 380, 315, 250, 157 sq. ft.
4-6% Chr. Tube: 1000, 500 sq. ft.
Fin Tube: 73, 21, 11 sq. ft.

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Hot-Oil: 324 gpm @ 4600'; 735 gpm @ 3100'; 400 gpm @ 2000'; 1270 gpm @ 408'.
Water: 10,500 gpm @ 135'

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Worth.: LTC-6, Gas Engine, 800 hp. 1 IR PVG-4 Gas Engine

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120" OR 132" STROKE pumping unit, used, in good condition. Box No. 281, Crossville, Illinois.

NEW CHROME MOLY Furnace Tubing 2⅜" to 4½" OD 20' to 44' long. SAVE ½. Write for list. HEAT & POWER CO., INC., 306 Thompson Bldg., Tulsa.

FOR SALE OR EXCHANGE—Fully equipped D8 Tractor, D7 Tractor, Mack Truck and Utility Trailer, overhauled six cylinder GMC Power Unit, overhauled four cylinder GMC Diesel Engine, for 36L Bucyrus or Cardwell or equivalent Spudder in good working condition. Contact Ted Pappas, P. O. Box 132, Crescent City, California.

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3 Failing Model 1500 Drill Rigs w/25' mast, 18" kelly, 5x6 GD Pump and automatic chuck.

Mounted on Ford Marmon-Herrington Six-wheel drive tandem rear.

4 Custom-built Marmon-Herrington Reel trucks, four-wheel drive.

6 Custom-built Marmon-Herrington four-wheel drive water trucks w/670 gallon tanks. (1 two-wheel drive).

1 Shooting Truck w/600 gallon tank.
All trucks are Ford 6's & 8's, '51 & '52 model, except 2—1948 6-cyl. water trucks.

Also miscellaneous supplies and shop equipment.

The Superior Oil Company
Midland, Texas

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HEAT EXCHANGERS—Steel Tubes 1242-1180-1080-760-425-318-218-128 sq. ft. ADM. Tubes—1300-1080-464-331-135 sq. ft.

TOWERS—6'x30'—9 Trays: 5'x58'—26 Trays: 6'x82'—20 Trays: 5'x24' Packed: 3'9"x26'—4 Trays: 2'x34'—16 Trays: 9'6"x48' Vacuum.

REACTORS—10'x15'x1-7/64": 3'x23'—475 PSI: 12¾"x18'—475 PSI.

REBOILERS—750 sq. ft.: 318 sq. ft. U Tube Bundles.

AGITATORS—1000 Bbl. 20'x18' Plus 10' CONE.

FURNACES—1000 to 6000 Bbl. per day CHROME TUBES AND HEADERS.

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PROPANE Gas Dehydrator—ANDERS automatic 20,000 GPD.

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1 36L BUCYRUS Spudder complete with 5 and 7 inch tailing in tools. Dog house butane tank, junk rack and light plant. Rod and tubing tools and hand tools. Phone Office 144, Res. 614, Cleveland, Oklahoma.

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315 CFM SCHRAMM Portable Compressor, UD 18A Diesel Engine, Radiator cooled, skid mounted. Used only 300 hours. Heat & Power Co., Inc., 306 Thompson Bldg., Tulsa, Oklahoma.

FOR SALE: Rotary Rig Complete with National T-20 Drawworks single powered by WAK Waukesha Engine. 87' Lee C. Moore Jackknife. 7¼"x14" Oilwell Pump single powered by LeRoi L-3000 V-12 engine. 4750' of good 4½" drill pipe. 10 Drill Collars and all necessary equipment to complete rig. Call or write Travis Drillers, Inc., P. O. Box 1097, Austin, Texas. Phone GR 7-7725 or GR 8-5044.

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Complete with tools, 300-ft. heavy-duty 15-ft. drill pipe. Water truck, drill truck, and pickup. All good condition. Write:

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Pumping Units, All Sizes.
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Call or Write

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ROTARY RIG with National 40 drawworks single powered by Diesel engine. 6¼" x 12" Gardner-Denver powered Diesel. 3000' drill pipe. Rig mounted on rubber. All necessary equipment to complet rig. Write Box 444, Okmulgee, Oklahoma.

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NEW 7-IN. OD J-55 Seamless casing. Mill test 3,000 lb., 8 round thread. $1.65 and up. F.O.B. Houston and Alice. Bellaire Pipe & Supply, 8020 Lyons Avenue, Houston, phone ORchard 4-2763.

CABOT PUMPING UNIT, Witte engine, 2900' 5½" casing, rods, pump, 3—220 barrel tanks. Complete well equipment, located Sabetha, Kansas. Telephone DIamond 3-8292, Tulsa, Okla.

U-34 DIESEL POWERED drilling rig with Lee C. Moore pin type 96' derrick, 6' substructure G-D 14" pump. Running Denver Basin Area. All in good condition ready to drill. Will sell with or without 3½" drill pipe. Can be financed for responsible party. W. F. Rogers Drilling Company, 1202 Fourth Ave. Scottsbluff, Nebraska.

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In Place by CHEROKEE PIPE LINE COMPANY

10—Complete Main Line Pump Stations on line formerly owned by Ajax Pipe Line Company from Jenks, Oklahoma, to Wentzville, Missouri.
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2—Model PCS—2505 Buda gas engines with electric starters.
10—480 HP Worthington 4 cylinder Diesel Engines.
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2—6" x 36" Prescott triplex plunger pumps.
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Engines and pumps are complete.
8—6 x 10 Dean Brothers power pumps, less motors.
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CONTACT: MATERIAL DIVISION, PURCHASING DEPARTMENT

CONTINENTAL OIL COMPANY
PONCA CITY, OKLAHOMA.

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INGERSOLL-RAND Gas Compressors 225 H.P. $5000 each. Phone 3664. Riverdale Gas Production Co., Sumner, Michigan.

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5½" NEW McClatchie liners for 7¼ x 10 FXO and 7¼ x 12 FXZ Gardner-Denver pump—$60.00 each. Skid-mounted 7¼ x 10 FXO Gardner-Denver pump with WAK Waukesha—$5,500.00. Trailer-mounted 7¼ x 14 FXK Gardner-Denver pump with twin 671 GM diesel—$15,000.00. 30", 3-sheave Ideal streamlined traveling block—$600.00. 1705 Burton Way, Bakersfield, Calif.

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WANTED TO BUY—used Oil Storage tanks, any size—any where. Coleman, Inc. Box 115—Northwood, Iowa.

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HERE is an unusual opportunity to step into a second-from-the-top job as Assistant Chief Mechanical Design Engineer. It is offered by one of the oil industry's oldest and largest manufacturers of conventional and pneumatic pumping units.

If you have had at least five years experience and are looking for a chance to get ahead, this could be the very opportunity you've been waiting for.

Salary is open and will depend entirely on experience and ability. Send complete resume to Post Office Box 12007, Fort Worth, Texas.

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Drilling superintendent for 2 year foreign operation. Excellent salary. Send complete resume and references. All replies held strictly confidential.

BOX K-700,

THE OIL AND GAS JOURNAL,

4041 Marlton Ave., Los Angeles 8, Calif.

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CPA for internal audit staff, well established and growing concern. Must be willing to travel 80% of time—Europe, South America, Canada and the United States. Must have at least three years public accounting experience with a National Certified Public Accounting Firm. Excellent future for right man. Salary commensurate with experience. Submit detailed resume.

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The Oil and Gas Journal,

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FOREIGN EMPLOYMENT. List oil companies, drilling contractors, seismograph contractors, showing where apply foreign jobs. $5.00 cash. OIML Co., Box 2603, Tulsa, Okla.

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THE POSITION YOU WANT: Oil Industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal, Tulsa, Oklahoma.

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BOX K-701,

THE OIL AND GAS JOURNAL,

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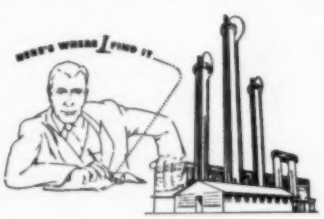
FOREIGN ASSIGNMENT for top subsurface geologist, 38. Can leave family for reasonable period. Also versed in evaluation and administration. Box K-705, The Oil and Gas Journal, Tulsa, Oklahoma.



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GEOLOGIST: 2½ yrs. South American experience seeks domestic position. Resume on request. J. C. Loomis, 523 Gen. Krueger, San Antonio 1, Texas.

FORT WORTH, DALLAS trade area—Independent operator bookkeeping and Tax Service on retainer. Box K-722, The Oil and Gas Journal, Tulsa, Oklahoma.

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WELL RECORDS FOR SALE. Microfilms of a complete set of completion cards through August, 1955, for Oklahoma and Kansas, at $550.00 per state. Box K-710, The Oil and Gas Journal, Tulsa, Oklahoma.

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LEASE AND DRILLING BLOCKS

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HAVE SOME working interest to offer for only $375 per ⅛ to drill shallow Dutcher well just across the road from two live pumpers and one gas well. Drill location staked by geophysical survey. Write Lewis Snavely, P. O. Box 315, Coweta, Okla.

LEASE FARM-OUTS in Ohio. Coshocton County (Layland Field), Wayne County (Mooreland Field). Box 215, Lodi, Ohio. Phone 3881—Lodi, Ohio (appointment).

40,000 ACRE solid block in Nebraska. Will divide, checkerboard, or sell complete block. Want drilling this year. Kirkwood Oil: Suite 715, Security Life Building, Phone CHerry 4-7476, Denver, or 1611 City National Bank Building, Phone JAckson 7484, Omaha.

SOME WORKING INTEREST for sale at $400 per ⅛ to drill shallow Dutcher and Pitkin lime well in the near future to offset gas well that made three quarter million ft. wet gas. Lewis Snavely, Geologist, P. O. Box 315, Coweta, Okla.

PRODUCING ROYALTY, leases and wildcat drilling blocks in North Texas. Will sell interest for part cash and stock in reliable Co. Box K-703, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCING COMPANY would like to purchase good producing leases and royalties having some undeveloped locations. Any submitted must be accompanied with complete information and price. Box K-647, The Oil and Gas Journal, Tulsa, Oklahoma.

CALDWELL COUNTY, TEXAS; 15 acres offsetting production, proven lease, 30 producing day. Write John C. Sterge, 84 State Street, Boston, Mass.

2,153 ACRE LEASE in Northern Converse County, Wyoming. Town. 40N, Range 72W. Nearby crevice well has 6,100 lb. gas pressure and high gravity paraffin base crude. Adjoining junked test had 38 foot bleeding core in Parkman. Prefer major company of integrity. Will be glad to consider your bids. Harry H. Stevick, Antelope Creek Ranch, Bill, Wyoming.

PRODUCTION WANTED

WANTED: Oil properties, 100 to 5,000 barrels daily in Oklahoma and Kansas. Morris Sitrin, P. O. Box 1160, Tulsa, Okla.

WANTED: Oil producing properties in sizable amounts. Promise prompt reply. R. E. Clement, Box 65, Norman, Oklahoma.

WANTED by large Eastern Corp. Gas & Oil Production. If your property has a complete reputable engineer's report showing good primary reserve and not to exceed a net five year pay out on present day production, we are ready to pay off on any size deal. Please state briefly what you have to offer, confidential, references gladly furnished. Box K-724, The Oil and Gas Journal, Tulsa, Oklahoma.

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The Puerto Rico Water Resources Authority will receive up to July 15, 1958, sealed proposals for the furnishing of fuel oil for the first two units of its Palo Seco Steam Plant in San Juan, Puerto Rico, expected to start operation in the second quarter of 1960 with an estimated annual consumption of two million barrels of Bunker "C" Fuel Oil. Specifications and other information concerning this bid may be obtained from the Purchasing Officer,

PUERTO RICO WATER RESOURCES AUTHORITY,
P. O. Box 4267,
SAN JUAN, PUERTO RICO.

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MORE LOGS ARE FILED in Kraftbilt Strip Log Cabinets than all others combined. Loaded drawers glide smoothly on roller bearings. Three drawers per section, add sections as needed. Bilt to last a lifetime! Send for Catalog 58-B. Ross-Martin Co., P. O. Box 800-A, Tulsa 1, Okla.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 76.48 acres of land within the known geologic structure of the Elm Grove and Rodessa fields in Caddo Parish, Louisiana, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 p. m., EST, June 11, 1958, when bids will be opened. Details of the lease offering, description of the lands, how and where to submit bids and bid forms may be obtained from the Manager, Eastern States Land Office, Bureau of Land Management, Washington 25, D. C., H. K. Scholl, Manager.

LEGAL

Department of the Interior, Bureau of Indian Affairs, Jicarilla Indian Agency, Dulce, New Mexico. Sealed bids will be received until 3:00 P. M., Mountain Standard Time, June 19, 1958, and then opened at that time in the Office of the Jicarilla Indian Agency, Dulce, New Mexico, for the leasing of 141,560 acres of Tribal Indian land located in Sandoval and Rio Arriba Counties, New Mexico, within the Jicarilla Indian Reservation, for oil and gas mining purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of the Jicarilla Indian Agency, Dulce, New Mexico.

LEGAL

SEALED BIDS will be received until 2:00 P. M. July 9, 1958, Standard Time, and opened at that time in the Office of the Turtle Mountain Consolidated Indian Agency, Belcourt, North Dakota, for the leasing of 2,758.30 acres of Tribal land and 920.0 acres of allotted Indian land, located in Townships 161 and 162 North, Ranges 71 and 72 West, Rolette County, North Dakota, for oil and gas mining purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of the Turtle Mountain Consolidated Indian Agency, at Belcourt, North Dakota, or by a call to telephone No. 6742, Rolla, North Dakota.

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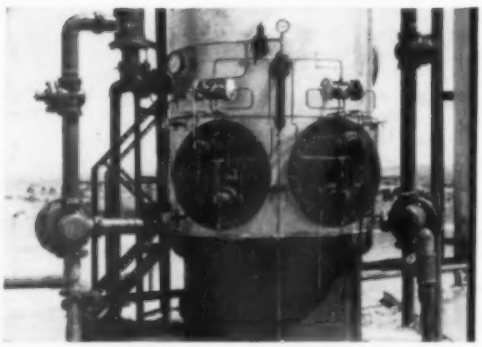

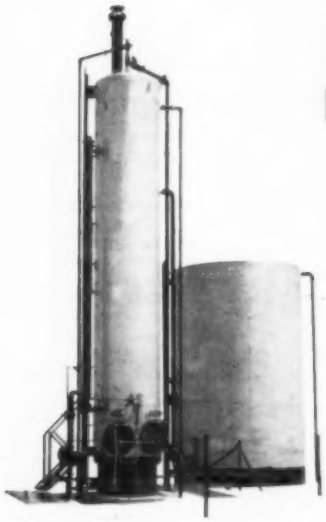

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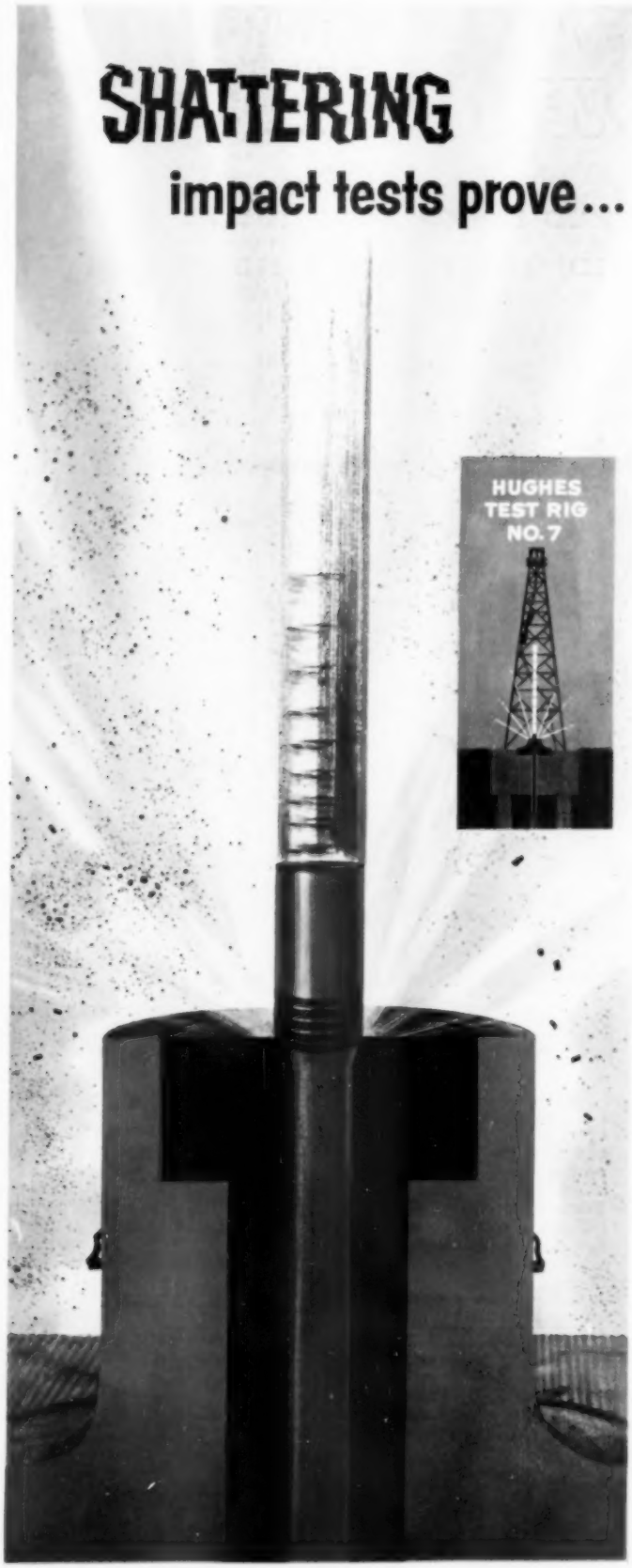

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This is equivalent to *suddenly* and *repeatedly* dropping 30,000 feet of 3½-inch, 13.30 lb., drill pipe and catching it on the tool joint shoulder.

In more than 200 of these destruction drop tests — the *severest to which pipe welds have ever been subjected* — not a single weld, produced by the new process, was broken.

With the new Hughes heat treating process you get the benefit of the greatest advance yet made in tool joint-to-pipe connections.

HUGHES TOOL COMPANY

DEVELOPERS OF "FLASH-WELD," "SEAL-GRIP" AND COUNTERBORE WELD TOOL JOINTS